

# NSS 322

# SURGICAL NURSING

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**NATIONAL OPEN UNIVERSITY OF NIGERIA**



**NSS 322**  
**MEDICO – SURGICAL NURSING II**

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## Introduction

Nursing is a practice-related profession that involves both theory and clinical practice. It therefore involves the cognitive (knowledge), affective (attitudes, values) and psychomotor (skills and competencies) domains. In this course you will be expected to acquire appropriate and relevant knowledge, attitudes, values, skills and competencies necessary for you to provide effective and qualitative care to clients in health care institutions, communities and industries. Medico-Surgical Nursing encompasses the professional care given by the nurse to clients with acute and chronic medical and surgical problems. Such care is based on the knowledge gained from the biological, physical and behavioural sciences. This course, Medico-Surgical Nursing 2, will build on what has been covered in Medico-Surgical nursing 1. It will also provide further understanding of client care needs related to disease processes associated with various systems of the body. Pathophysiology is an important aspect of Medico-surgical nursing at this level. Knowledge gained in this course will enable you to assess and diagnose clients' health problems and care needs and formulate and implement relevant nursing care interventions based on the needs of individuals and families.

During the course in Medico-Surgical Nursing 1, you learned about the Nursing process which is made up of 5 steps – *assessment, analysis and nursing diagnosis, nursing care planning, implementation of care (intervention) and evaluation*. You should go back and review the nursing process in the course material before proceeding.

## What You Will Learn in this Course

This course Medico-Surgical Nursing II is a 3-credit unit course available to all nursing students as part of the courses required for the programme. It is broken into four separate units which consist of medical-surgical conditions in systems that perform similar functions. It is called **Medical-surgical problems associated with the intake and utilization of materials**.

At the end of this course, it is expected that you should be able to understand, explain and be adequately equipped to deal with issues associated with intake and utilization of materials and be able to apply them to everyday experiences.

The Course Guide, therefore, tells you briefly what the course: Medico-Surgical nursing II is all about, the types of course materials to be used, what you are expected to know in each unit, and how to work through the course material. It suggests the general guidelines and also

emphasises the need for self assessment and Tutor-Marked Assignment. There are also tutorial classes that are linked to this course and students are advised to attend.

### **What You Will Learn in this Course Material**

The overall aim of this course NSS 322: Medico-Surgical Nursing II is to introduce students to medical surgical conditions of the respiratory system (upper and lower respiratory organs), assessments and diagnostic procedure and common interventions for respiratory disorders, Medical-surgical conditions of the Gastrointestinal(digestive) system and those of the accessory organs which include: liver, biliary tract and exocrine pancreatic disorders.

### **Course Aims**

This course aims at providing further understanding of client care needs, related to disease processes associated with various systems of the body.

### **Course Objectives**

Note that each unit has specific learning objectives. You should read them carefully before going through the unit. You may want to refer to them during your study of the unit to check on your progress. You should always look at the unit objectives after completing a unit. In this way, you can be sure that you have done what is required of you by the unit.

### **Working through this Course**

To complete this course, you are required to read the units, the recommended text books and other relevant materials. Each unit contains some self assessment exercises and Tutor-Marked Assignments, and at some point in this course, you are required to submit the tutor marked assignments. There is also a final examination at the end of this course. Stated below are the components of this course and what you have to do.

### **Course Materials**

The major components of the course are:

1. Course Guide
2. Study Units
3. Text Books
4. Assignment File
5. Presentation Schedule

## Study Units

There are four study units in the material. These are:

### **Main Module: Medico-Surgical Problems Associated with Intake and Utilization of Materials**

- Unit 1        Medico-Surgical Conditions of the Respiratory System (Upper and Lower Respiratory Organs)
- Unit 2        Assessments and Diagnostics Procedures and Common Interventions for Respiratory Disorders
- Unit 3        Medico-surgical Conditions of the Gastrointestinal (Digestive) System
- Unit 4        Medico-Surgical Conditions of the Accessory Organs of Digestion (Liver, Biliary Tract and Exocrine Pancreatic Disorders)

Each unit contains Self Assessment Exercise and Tutor-Marked Assignments of which you are required to attempt. It is believed that these exercises will assist you to achieve the learning objectives of the units.

## Textbooks and References

These texts will be of immense benefit to this course:

Black, J, M, & Matassarini-Jacobs, E. Luckmann & Sorenson (2000) *Medical -Surgical Nursing: A Psychophysiologic Approach*, W.B. Saunders Co., Philadelphia (Chapters 35, 38, and 39).

Gulanick, M., Myers, J.L. Klopp, A., Gradishar, D., Galanes, S. & Puzas, M. K. (2003) *Nursing Care Plans-Nursing Diagnosis and Interventions*, Mosby, St. Louis.

Smeltzer, S.C. & Bare, B.G. Brunner & Suddarth (2004) *Textbook of Medical-Surgical Nursing*, Lippincott Williams & Wilkins, Philadelphia (Chapters 22 to 24).

Smith, S.F. & Duell, D.J. (1996) *Clinical Nursing Skills: Basic to Advance Skills*, Appleton & Lange, Stamford Connecticut

## **Assignment File**

The assignment file will be given to you in due course. In this file, you will find all the details of the work you must submit to your tutor for marking. The marks you obtain for these assignments will count towards the final mark for the course. In all, there are four (4) Tutor-Marked Assignments for this course. You are encouraged to submit the assignment as and when due.

## **Assessment**

There are two aspects to the assessment in this course. First, there are Tutor-Marked Assignments; and second, the written examination.

You are thus expected to apply knowledge, comprehension, information and problem solving gathered during the course. The Tutor-Marked Assignments must be submitted to your tutor for formal assessment, in accordance with the deadline given. This you will obtain from the study centre and your facilitator. The work submitted will count for 40% of your total course mark.

At the end of the course, you will need to sit for a final written examination. This examination will account for 60% of your total score.

## **Tutor-Marked Assignment**

There are four TMAs in this course. You need to submit all the TMAs. When you have completed each assignment, send them to your tutor as soon as possible before the stated deadline. If for any reason you cannot complete your assignment on time, contact your tutor before the assignment is due to discuss the possibility of extension. Extension will not be granted after the deadline, unless on exceptional cases.

## **Final Examination and Grading**

The final examination of NSS 322 will be of three hours' duration and have a value of 60% of the total course grade. The examination will consist of questions which reflect the self assessment exercise and tutor-marked assignments that you have previously encountered. Furthermore, all areas of the course will be examined. It is also better to use the time between finishing the last unit and sitting for the examination, to revise the entire course. You might find it useful to review your TMAs and comment on them before the examination. The final examination covers information from all parts of the course.

## Course Marking Scheme

The following table details the course marking scheme

Table 1 Course Marking Scheme

<b>Assessment</b>	<b>Marks</b>
Assignment 1-4	4 assignments, Total = 10% X 4 = 40%
Final Examination	60% of overall course marks
Total	100% of Course Marks

## How to Get the Most Out of this Course

In distance learning, the study units replace the university lecturer. This is one of the huge advantages of distance learning mode; you can read and work through specially designed study materials at your own pace and at a time and place that suit you best. Think of it as reading the lecture instead of listening to the lecturer. In the same way that a lecturer might set you some readings to do, the study guide tells you what to read, when to read and the relevant texts to consult. You are provided exercises at appropriate points, just as a lecturer might give you an in-class exercise.

Each of the study units follows a common format. The first item is an introduction to the subject matter of the unit and how a particular unit is integrated with the other units and the course as a whole. Next to this is a set of learning objectives. These learning objectives are meant to guide your studies. The moment a unit is finished, you must go back and check whether you have achieved the objectives. If this is made a habit, then you will significantly improve your chances of passing the course. The main body of the units also guides you through the required readings from other sources. This will usually be either from a set book or from other sources.

Self assessment exercises are provided throughout the unit, to aid personal studies and answers are provided at the end of the unit. Working through these self tests will help you to achieve the objectives of the unit and also prepare you for tutor marked assignments and examinations. You should attempt each self test as you encounter them in the units.

The following are practical strategies for working through this course

1. Read the Course Guide thoroughly
2. Organize a study schedule. Refer to the course overview for more details. Note the time you are expected to spend on each unit and how the assignment relates to the units. Important details, e.g. details of your tutorials and the date of the first day of the semester are available. You need to gather together all these information in one place such as a diary, a wall chart calendar or an organizer. Whatever method you choose, you should decide on and write in your own dates for working on each unit.
3. Once you have created your own study schedule, do everything you can to stick to it. The major reason that students fail is that they get behind with their course works. If you get into difficulties with your schedule, please let your tutor know before it is too late for help.
4. Turn to Unit 1 and read the introduction and the objectives for the unit.
5. Assemble the study materials. Information about what you need for a unit is given in the table of contents at the beginning of each unit. You will almost always need both the study unit you are working on and one of the materials recommended for further readings, on your desk at the same time.
6. Work through the unit, the content of the unit itself has been arranged to provide a sequence for you to follow. As you work through the unit, you will be encouraged to read from your set books.
7. Keep in mind that you will learn a lot by doing all your assignments carefully. They have been designed to help you meet the objectives of the course and will help you pass the examination.
8. Review the objectives of each study unit to confirm that you have achieved them. If you are not certain about any of the objectives, review the study material and consult your tutor.
9. When you are confident that you have achieved a unit's objectives, you can start on the next unit. Proceed unit by unit through the course and try to pace your study so that you can keep yourself on schedule.

10. When you have submitted an assignment to your tutor for marking, do not wait for its return before starting on the next unit. Keep to your schedule. When the assignment is returned, pay particular attention to your tutor's comments, both on the tutor-marked assignment form and also on the written assignment. Consult your tutor as soon as possible if you have any questions or problems.
11. After completing the last unit, review the course and prepare yourself for the final examination. Check that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in this Course Guide).

### **Facilitators/Tutors and Tutorials**

There are 15 hours of tutorial provided in support of this course. You will be notified of the dates, time and location together with the name and phone number of your tutor as soon as you are allocated a tutorial group.

Your tutor will mark and comment on your assignments, keep a close watch on your progress and on any difficulties you might encounter and provide assistance to you during the course. You must mail your tutor marked assignment to your tutor well before the due date. At least two working days are required for this purpose. They will be marked by your tutor and returned to you as soon as possible.

Do not hesitate to contact your tutor by telephone, e-mail or discussion if you need help. The following might be circumstances in which you would need to contact your tutor:

If you do not understand any part of the study units or the assigned readings.

If you have difficulty with the self test or exercise

If you have questions or problems with an assignment, with your tutor's comments on an assignment or with the grading of an assignment.

You should try your best to attend the tutorials. This is the only chance to have face to face contact with your tutor and ask questions which are answered instantly. You can raise any problem encountered in the course of your study. To gain the maximum benefit from the course tutorials, prepare a question list before attending them. You will learn a lot from participating in discussion actively.

Best of luck.



**MAIN  
COURSE**

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## **MODULE 1      MEDICO-SURGICAL                      PROBLEMS ASSOCIATED      WITH      INTAKE      AND UTILIZATION OF MATERIALS**

- Unit 1      Medico-Surgical Conditions of the Respiratory System (Upper and Lower Respiratory Organs)
- Unit 2      Assessments and Diagnostic Procedures and Common Interventions for Respiratory Disorders
- Unit 3      Medico-Surgical Conditions of the Gastrointestinal (Digestive) System
- Unit 4      Medico-Surgical Conditions of the Accessory Organs of Digestion (Liver, Biliary Tract and Exocrine Pancreatic Disorders)

### **UNIT 1      MEDICO-SURGICAL CONDITIONS OF THE RESPIRATORY SYSTEM**

#### **CONTENTS**

- 1.0      Introduction
- 2.0      Objectives
- 3.0      Main Content
  - 3.1      Review of the Structure and Functions of the Respiratory System
  - 3.2      Medico-Surgical Disorders of the Upper Respiratory Tract (Upper Airways)
  - 3.3      Medico-Surgical Disorders of the Chest and Tracheo-Bronchial Tree (Lower Respiratory Tract)
- 4.0      Conclusion
- 5.0      Summary
- 6.0      Tutor-Marked Assignment
- 7.0      References/Further Readings

#### **1.0      INTRODUCTION**

Disorders of the respiratory system are common. Because respiratory disorders are usually associated with some form of respiratory distress, clients with respiratory conditions are often anxious. You need to understand this in order to reassure the patient and assist him to ensure adequate oxygen intake. You need to acquire good assessment skills and be able to identify and understand the significance of abnormal breath sounds. You also need to know what to do to assist clients breathe properly in order to aerate the lungs.

Upper respiratory infections are common and rarely life-threatening. Most of them are minor in their symptoms and effects and rarely require hospitalization but are treated as out patient cases. However depending on patient's immunity status, some may have severe symptoms that require hospitalization. On the other hand lower respiratory conditions are often serious and sometimes life-threatening because they interfere with gaseous exchange in the lungs. Most of these conditions are associated with severe chest pain, breathing difficulties and fever which make the patient very sick. The nurse is required to give appropriate care in order to prevent life-threatening complications.

## **2.0 OBJECTIVES**

After going through this unit, you should be able to:

- describe the structure and function of the upper and lower respiratory tracts
- describe the pathophysiology of the medical and surgical conditions affecting the upper and lower respiratory tracts
- compare the various disorders of the lower respiratory system with regard to causes, pathophysiology, signs and symptoms and prevention
- compare and contrast the types of pneumonia with regard to causes, symptoms and management
- differentiate between normal and abnormal breath sounds
- using the nursing process approach, discuss the management of patients with conditions affecting the organs of the respiratory system.

## **3.0 MAIN CONTENT**

### **3.1 Review of the Structure and Functions of the Respiratory System**

In your course in Anatomy and Physiology you learned about the structure and functions of the organs of the respiratory system. We will briefly review the relevant areas before discussing the medical and surgical conditions affecting the system. You will need to read up your study materials on respiratory anatomy and physiology to note the normal as this will increase your ability to fully understand the pathophysiology (abnormal physiology) of the medical-surgical conditions affecting the system. Try to draw diagrams of the structures that make up the system.

The respiratory system is made up of the upper and lower respiratory tracts. The upper tract comprises the nose, pharynx and larynx as well as

the paranasal sinuses. The upper respiratory structures are responsible for:

- Warming, filtering and humidifying inhaled air
- Conducting/channelling inspired air to the lower airway for gas exchange
- Channelling exhaled air outward for expiration.
- Protecting the lower airway from foreign matter through some reflex actions like coughing, sneezing

The paranasal sinuses are open areas within the skull lined with mucous membrane. They assist in warming and humidifying inspired air and modifying sound that is made through the larynx. The sinuses drain into the nose and become inflamed when there is infection in the upper respiratory tract.

The lower respiratory tract is made up of the tracheobronchial tree (trachea, bronchi, and bronchioles) and the lungs (made up of alveoli). It ensures that oxygen is delivered to the tissues through the blood stream and that waste gases are expelled during expiration. Together the upper and lower respiratory tracts are responsible for **ventilation** (movement of air in and out of the airways).

The respiratory system facilitates life sustaining processes in the body by:

- Ensuring ventilation
- Supplying oxygen to the tissues and getting rid of carbon dioxide

### **Box 1.1 Principles to note in respiration**

**Remember the following principles in respiration**

Air flows from an area of higher pressure to area of lower pressure. This process is known as **diffusion**

The size of the airway determines the resistance to the air flowing through it. Decrease in the diameter of the airway increases the resistance to the flow of air. This happens in asthma, bronchitis and other conditions

The alveoli of the lungs are elastic and this enables the lungs to expand and recoil during inspiration and expiration

Ventilation is controlled by both the respiratory muscles and the phrenic nerve

Lung function is viewed in terms of lung volumes and lung capacities.

### **SELF ASSESSMENT EXERCISE 1**

1. Look up your notes on respiratory physiology and list and describe the various lung volumes and lung capacities.
2. What is the normal value of the following and how can they be measured?
  - Tidal volume
  - Residual volume
  - Total lung capacity
3. List the disease conditions that can increase the residual volume.
4. Describe the mechanism of respiration.
5. Describe the neurological control of ventilation.

### **3.2 Medico-Surgical Disorders of the Upper Respiratory Tract (Upper Airways)**

Upper airway disorders are mainly in the form of infections which are common and affect many people. Some of them are viral in origin while others are bacterial. They may be acute or chronic. These infections include: **rhinitis, sinusitis, pharyngitis, laryngitis, tonsillitis and adenoiditis**. You will have to read up tonsillitis and adenoiditis. Most upper respiratory infections have similar clinical manifestations, diagnostic tests, and almost similar management. The common clinical manifestations of respiratory infections are cough with or without sputum (due to irritation of the air passages), dyspnoea, chest pain (due to coughing), cyanosis and sometimes haemoptysis. The sputum may be mucoid, purulent, rusty or blood stained. If adequately treated they heal without any residual problems. Apart from infections there may also be malignancies in some of these structures; especially the larynx and this will be considered.

#### **1. RHINITIS**

**Definition:** Rhinitis is a disorder characterized by inflammation and irritation of the mucous membrane of the nose resulting in nasal congestion and massive mucus secretion/drainage from the nose (**rhinorrhoea**). It may be acute or chronic, allergic, non-allergic or viral (common cold). Acute rhinitis is also known as “common cold” especially when viral in origin. It usually lasts for 5 to 7 days and is often treated symptomatically. Allergic rhinitis commonly occurs as a seasonal disorder.

**Causes:** The causes of rhinitis include:

- Allergy to dust, smoke, chemicals, pollen, certain drugs, certain foods, cosmetics, paint, sawdust etc. (allergic rhinitis)
- Nasal polyp
- Changes in temperature and humidity, presence of foreign body in the nose, certain systemic drugs e.g. some anti-hypertensive drugs, some oral contraceptives, chronic use of nasal decongestants etc. (non-allergic rhinitis)
- Viruses e.g. rhinovirus, Parainfluenza and influenza viruses, corona virus and adenovirus etc.

**Pathophysiology:** When the causative factors of rhinitis are present, the mucous membrane lining the nasal passages become inflamed, congested and oedematous. The swollen nasal conchae block the opening into the paranasal sinus resulting in *blocked nose, excessive nasal discharge with runny nose (rhinorrhoea), nasal itchiness and sneezing*. The nasal discharge is usually clear unless the infection spreads to the sinuses; in which case they become purulent. In the case of allergic rhinitis, in addition to nasal obstruction, there is also irritation of the mucous membranes (conjunctiva) of the eyes causing excessive tears formation.

## **NURSING PROCESS RELATED TO THE PATIENT WITH RHINITIS**

### **Assessment**

1. **Health History:** health history focuses on the physical and functional problems of the patient, the chief reason why the patient came to seek health care and the impact of the signs and symptoms on the patient's abilities. In rhinitis, there is history of upper respiratory infection with sneezing, mucus discharge from the nose, loss of sense of smell and general fatigue and malaise.
2. **History of exposure** to dust, smoke, pollen, chemicals, especially paint, sawdust etc.

Exposure may be due to:

- a) Habits e.g. smoking (cigarettes, cigars, pipes, marijuana) and the use of smokeless tobacco (snuff) or alcohol. Alcohol has been found to slow down the action of cilia in the nose, reduce mucus clearance and depress cough reflex.
- b) Occupations that involve exposure to certain air pollutants and allergens e.g. smoke, dust, cement, fumes, silica, paint, grain dust, fertilizers, asbestos, animal dander, etc.

- c) Living in a geographical location with pollutants e.g. moulds, fumes, smoke, factory dust etc.

### 3. **Clinical Manifestations (Signs and Symptoms)**

The signs and symptoms of rhinitis are excessive nasal discharge/ runny nose (rhinorrhoea), nasal stuffiness, nasal itchiness, sneezing and headache. There may be sore throat in some cases.

- 4. **Physical Examination** - Nasal inspection using a penlight reveals swelling and redness of nasal mucosa with exudates or mild bleeding from crusting of exudates. It may also reveal polyps
- 5. **Diagnostic Tests and Investigations** – if there is a nasal polyp, biopsy is done and if the nasal discharge is purulent (signifying bacterial rhinitis), culture and sensitivity test is done.

### **Nursing Diagnoses**

- 1. Ineffective airway clearance related to excessive mucus production by nasal mucosa secondary to inflammation. In rhinitis ineffective airway clearance may also be related to decrease ciliary function.
- 2. Risk of fluid volume deficit related to increased fluid loss through nasal secretions.
- 3. Risk of imbalanced nutrition: less than body requirements, related to excessive nasal discharge. Nasal discharge contains protein and electrolytes.

*The old term for this nursing diagnosis was “altered nutrition” but the current term is “imbalanced nutrition”*

- 4. Altered body comfort (headache) related to inflamed nasal conchae and nasal congestion.
- 5. Risk of infection related to retained secretions
- 6. Knowledge deficit regarding disease process, causative factors and prevention of re-infection.

### **Planning and Implementation (Management)**

The goals of management are:

- To treat the infection
- To overcome any allergy
- To relieve nasal congestion and maintain a patent airway.

### **Nursing Management**

1. You need to encourage the patient to rest in a comfortable position but to assume the upright position more as this helps in the drainage of the mucus and eases respiration.
2. Provide warm moist air (steam inhalation) to relieve nasal congestion.
3. If there is sore throat, warm salt water gargles soothes this. If you have ever had sore throat you know how warm water gargle helps to relieve pain, therefore instructs the patient to do this twice a day.
4. Monitor patient's condition, assess patient for possible complications and manage them. If the patient is not admitted in hospital, instruct patient and his family to monitor for signs of complications and seek immediate medical care.
5. Nutrition and fluids – advise on nutritious diet with high amount of protein and copious fluids (to replace loss through nasal discharge) and high intake of Vitamins B and C (to enhance resolution of the infection and ensure rapid healing). Fluids may be in the form of fruit juice (high in vitamin C) and warm beverages. Apart from replacing loss, fluids also help to thin the secretions so that they can be easily expectorated.
6. Patient teaching: The patient should be told to:
  - Avoid stress
  - Avoid exposure to irritants and allergens and avoid smoking and alcohol use
  - Get enough rest and sleep
  - Practise good health habits e.g. cover mouth when coughing or sneezing or blowing the nose
  - Practise good oral hygiene and proper hand washing
  - Use disposable tissues when removing nasal secretions
  - Also teach the patient proper technique for using nasal saline or aerosol spray to soothe inflamed membranes and soften crusted secretions e.g. to blow nose before application but not to overuse intranasal decongestants.

## Medical Management

Treatment is symptomatic and depends on the cause.

For *non-allergic rhinitis*, the antimicrobial agents that are effective against the causative microbes are usually prescribed for bacterial rhinitis but are ineffective in viral rhinitis. Also prescribed are oral decongestants e.g. Pseudo-ephedrine

For *allergic rhinitis*, the following are usually done:

- Allergy evaluation to determine the offending allergen
- Corticosteroid (both systemic and as nasal drops) is administered
- Antihistamine (oral) to reduce nasal and eye itchiness

## Evaluation

Expected patient outcomes include the maintenance of a patent airway through decreased nasal congestion. These outcomes are achieved with effective interventions which make infection and allergic reactions to subside and clear up and the airway to become free of excessive secretions. However if these are not achieved infection spreads to the sinuses, pharynx and larynx resulting in sinusitis, pharyngitis and laryngitis.

## 2. SINUSITIS

**Definition:** This is inflammation of one or more of the para nasal sinuses. It frequently develops as a result of infections of the upper respiratory tract e.g. rhinitis. It affects over 14% of the population. People who by the nature of their job/occupation are continuously exposed to chemicals, paints, sawdust etc are particularly prone to sinusitis. **Sinusitis may be acute or chronic.** It is referred to as chronic when symptoms last over 3 weeks in an adult and over 2 weeks in a child.

**Causes:** The common causes include:

- Nasal polyps and tumours
- Rhinitis
- Unresolved bacterial and viral infections of the upper respiratory organs -60% of such infections are caused by bacteria e.g.

Streptococcus pneumoniae, Haemophilus influenzae and Moraxella catarrhalis.

- Exposure to environmental irritants like chemicals, paint, sawdust etc.
- Dental infections
- Chronic sinusitis may also be caused by fungal infection (Aspergillus) in immuno-compromised patients

**Pathophysiology:** The sinuses are air-filled cavities that usually drain into the nose. They are normally protected against infection by mucus and ciliary actions. However if their openings into the nasal cavity are obstructed by nasal inflammation and congestion from rhinitis or other upper respiratory infections; mucus accumulates in the sinuses and become infected. This results in *nasal congestion, headache, ear pain and fullness, facial pain, decreased sense of smell, etc.* the sinus infection may spread to the teeth causing dental infections.

Narrowing or obstruction of the frontal, maxillary and ethmoid sinuses usually result in chronic sinusitis which causes accumulation and stagnation of nasal secretions which become an ideal medium for infection. In chronic sinusitis, the thick discharge constantly drips backwards into the nasopharynx resulting in *cough, chronic headache, hoarseness of voice, nasal stuffiness and fullness in the ears.*

## **NURSING PROCESS RELATED TO THE PATIENT WITH SINUSITIS**

### **Assessment**

1. **Health History:** In acute sinusitis, there is history of recent exposure to some irritants and allergens. The patient complains of facial pain or pressure over the infected sinus, nasal obstruction and discharge, headache, and decreased sense of smell.

In chronic sinusitis, the patient presents with history of chronic nasal stuffiness, chronic headache, especially over the peri-orbital area, and cough.

2. **History of Exposure** to dust, smoke, pollen, chemicals, especially paint, sawdust etc.

Exposure may be due to:

- a) Certain habits e.g. smoking (cigarettes, cigars, pipes, marijuana), use of smokeless tobacco (snuff), alcohol use. Alcohol has been found to slow down ciliary action, reduce mucus clearance and depress cough reflex.

- b) Occupations that involve exposure to certain air pollutants and allergens e.g. smoke, dust, cement, fumes, silica, paint, grain dust, fertilizers, asbestos, animal dander, etc.
- c) Living in a geographical location with pollutants e.g. moulds, fumes, smoke, factory dust etc.

**3. Clinical Manifestations (Signs and Symptoms):** In acute sinusitis, there is facial congestion and pain (especially around the eyes i.e. peri-orbital area and over the ear), fever, fatigue, severe headache, dental pain, nasal congestion and discharge, decreased sense of smell and sore throat.

Chronic sinusitis manifests with impaired cociliary clearance and ventilation, therefore the thick discharge drips backwards into the nasopharynx resulting in cough, chronic nasal stuffiness and fullness in the ears, chronic headache and facial pain, fatigue and decreased sense of smell and taste.

#### **4. Physical Examination**

- *Inspection* of the infected sinuses with light (transillumination) will reveal decreased transmission of light. In chronic sinusitis nasal endoscopy may be done to rule out tumours and other local disorders.
- *Palpation* will reveal tenderness over the infected sinus area
- *Percussion* – when the areas over the sinuses are tapped lightly, the patient experiences pain

#### **Diagnostic Tests:**

- Sputum and nasal swabs and throat culture will show the causative organism
- Sinus x-ray shows opacity, mucus thickening and bone destruction.
- Computed tomography scanning is the most important and most effective test in the diagnosis of sinusitis.

#### **Nursing Diagnosis**

Nursing diagnoses in sinusitis are similar to those in rhinitis

#### **Planning and Implementation (Management)**

#### **Objectives:**

- To treat the infection
- To reduce congestion of nasal mucosa
- To relieve pain

The management of both acute and chronic sinusitis is almost the same except in the use of antimicrobial agents.

### **Nursing Management**

1. Encourage the patient to rest.
2. Patient should maintain an upright position to enhance drainage from the sinuses and ease breathing.
3. Provide warm moist air (steam inhalation) to relieve nasal congestion. Steam inhalation loosens mucus secretions and promotes drainage from the sinuses. This may be done through steam bath, hot shower, facial sauna, heated mist.
4. If there is sore throat, warm salt water gargles and drinking of warm fluids help to soothe this.
5. Monitor patient's condition, assess patient for possible complications and manage them and if the patient is not admitted in hospital, instruct patient and his family to monitor for signs of complications and seek immediate medical care.
6. Nutrition and fluids – advise on nutritious diet with high amount of protein and copious fluids (to replace loss through nasal discharge) and high intake of Vitamin C (to enhance resolution of the infection and ensure rapid healing). The fluids, which should be warm, also help to thin the secretions so that they can be easily expectorated.
7. Pain is relieved by applying hot compresses over the infected sinuses or doing warm saline irrigation. Irrigation is only done for chronic sinusitis in which case the patient is asked to come to the hospital for it.
8. Patient teaching: the patient should be told to:
  - a. Avoid stress
  - b. Avoid exposure to irritants and allergens and avoid smoking and alcohol use
  - c. Get enough rest and sleep
  - d. Increase fluid intake and increase humidity of the environment by boiling a kettle of water in the room and allowing the steam to spread around
  - e. Use nasal spray with caution. The patient should be shown the correct procedure for applying nasal spray e.g. he should blow the nose before using spray and tilt the head slightly backwards and should also comply with the instructions by the manufacturers.

- f. Monitor for signs and symptoms of complications and seek immediate medical care if any complication occurs.
- g. Do steam inhalation once a day initially until nasal congestion reduces.
- h. Report to the hospital if headache becomes severe, neck rigidity occurs or fever persists despite treatment.

### Medical Management

1. Antimicrobial agents:
2. In **acute sinusitis**, first line antibiotics are used e.g. Amoxicillin 250-500 mg 8 hourly for 7-10 days (adults and children over 12 years) or Septrin 960 mg (2 tablets) 12 hourly for 7-10 days (adults and children over 12 years) or Erythromycin 250–500 mg 6 hourly for 7-10 days (adults and children over 12 years) or Azithromycin (Zithromax)

For **chronic sinusitis**, the antibiotics of choice may be first line e.g. Amoxicillin, Ampicillin or second line e.g. augmentin or third line e.g. Cefuroxime axetil (Ceftin), Azithromycin (Zithromax) 500 mg once daily for 3 days (adults and children over 12 years), Levofloxacin etc.

The course of treatment usually lasts up to 3 to 4 weeks.

3. Antihistamines e.g. Promethazine HCL (Phenergan) 10-20 mg or Chlorpheniramine maleate (Piriton) 2-4 mg 2-3 times a day or Diphenhydramine (Benadryl) till allergy subsides.
4. Anti-inflammatory drugs to reduce inflammation in the sinuses. Some anti-inflammatory drugs e.g. Cataflam also reduces pain.
5. Oral decongestants e.g. Pseudoephedrine HCL 1 capsule (120mg) 12 hourly for 3-5 days. **This drug is not for long term treatment.**
6. Topical decongestants e.g. Oxymetazoline HCL (0.025mg) 2-3 drops or 1 spray into each nostril, 3-4 times a day for up to 72 hours. The patient should be told to blow his nose before application and his head should be tilted back to promote maximum dispersion of the medication.
7. In chronic sinusitis with cough, an antitussive agent e.g. Codeine is prescribed to control the persistent and painful cough.
8. If the symptoms persist after 10 days, the sinuses may be irrigated with warm saline solution once a day.
9. When standard medical treatment fails, surgery is indicated either to correct structural deformities that obstruct the sinus openings or to drain and aerate the sinuses or remove fungal balls (in chronic sinusitis). Antibiotics and oral and topical corticosteroids are administered before and after surgery.

## Evaluation

With effective treatment, the prognosis is good as symptoms subside and the patient recovers. Expected patient outcomes are:

1. Patient becomes free of signs and symptoms of infection.
2. Patient reports absence of pain (around the eyes, over the ear on the face and headache).

But if the infection is untreated or poorly treated, acute sinusitis may lead to complications like meningitis, brain abscess, peritonsillar abscess and osteomyelitis (bone infection) of the turbinate, Ethmoid and Sphenoid bones. Complications of chronic sinusitis, though rare, include cavernous sinus thrombosis, meningitis, encephalitis and orbital cellulitis.

## 3. PHARYNGITIS

**Definition:** This is inflammation of the pharynx (throat). It may be acute or chronic and bacterial or viral in origin.

**Causes:** *Acute pharyngitis* is caused by:

- Viruses e.g. rhinovirus and bacteria especially A beta-haemolytic streptococcus. When caused by bacteria (especially A beta-haemolytic Streptococcus), it is known as Strep throat which usually results in symptoms of sore throat and is more severe than the viral type which usually subsides within 3 to 10 days unless complicated. Acute pharyngitis (whether viral or bacterial) is contagious and is spread by droplets. Diphtheria causes pharyngitis and this form is serious making the patient debilitated and acutely ill.

**Chronic Pharyngitis** (chronic pharyngeal inflammation) is a persistent inflammation of the pharynx with the following causes:

- Habitual use of tobacco and alcohol
- Living or working in dusty environments with constant exposure to dust and tobacco smoke.
- Excessive use of the voice also predisposes to a tendency of developing chronic pharyngitis.

**Pathophysiology:** When the throat is infected by viruses or A beta-haemolytic streptococcus in acute pharyngitis, the body responds by triggering an inflammatory response which results in vasodilatation and

oedema; with redness and swelling in the uvula, soft palate and tonsils. These cause sore throat, pain and fever. If left untreated, the inflammation spreads to the nearby structures and serious complications occur for example, sinusitis, peritonsillar abscess (abscess formation with creamy exudates on the tonsils), mastoiditis (inflammation of the mastoid process behind the ear), meningitis (inflammation of the meninges), pneumonia, rheumatic fever etc.

In chronic pharyngitis, the mucous membrane of the pharynx may become thickened and congested (hypertrophy) or in later stage become thin and wrinkled-looking (atrophy). When hypertrophy and atrophy of the mucosa occur the function of the pharynx is impaired.

## **NURSING PROCESS RELATED TO THE PATIENT WITH PHARYNGITIS**

### **Assessment**

1. **Health History:** The patient presents history of sore throat and fever
2. **Clinical Manifestations:** The signs and symptoms of *acute pharyngitis* are sore throat, difficulty in swallowing, fever, anorexia, malaise, cough and enlarged cervical lymph nodes. Symptoms of *chronic pharyngitis* depend on the severity of pharyngeal irritation and inflammation and include feeling of fullness in the throat, feeling of mucus sticking constantly to the upper part of the throat, excessive secretions in the throat, cough and difficulty swallowing.
3. **Physical Examination**
  - *Inspection:* inspection of the throat reveals a red, swollen pharyngeal membrane and sometimes tonsils
  - *Palpation* of the neck elicits pain and tenderness.
4. **Diagnostic examination**
  - Throat and nasal swabs for culture and sensitivity
  - Rapid screening test for streptococcal antigens and streptolysin titres

### **Nursing Diagnoses**

1. Altered body comfort (sore throat) related to inflammation of the pharynx. It may also be stated as acute throat discomfort related to inflammation of the pharynx.
2. Hyperthermia (body temperature above 39° C) related to effect of infection of the pharynx by viruses or bacteria.
3. Imbalanced nutrition: less than body requirements, related to difficulty swallowing.
4. Risk for spread of infection to other structures in the upper respiratory tract.

### **Planning and Implementation**

Objectives of management include:

- To treat the infection
- To prevent the spread of infection
- To relieve pain and sore throat
- To prevent complications

### **Nursing Management**

1. Instruct the patient to stay in bed during the febrile stage of the infection. Activity should be resumed gradually. This is because pharyngitis caused by A beta-streptococcus and diphtheria is usually severe and causes fatigue.
2. Prevent infection by telling patient to use disposable tissues to collect throat secretions and dispose used tissues properly to prevent spread of infection.
3. Relieve sore throat with warm saline gargles or irrigation and encourage the patient to drink warm fluids. For saline irrigation, the temperature of the water should be between 40.6°C to 43.3°C to be effective. Throat irrigation reduces spasms in the pharyngeal muscles and relieves soreness of the throat.
4. Promote personal comfort and prevent the development of fissures (cracks) on the lips by giving gentle mouth care at least twice a day. Emollient substance should be applied on the lips.
5. Nutrition and fluids – during the acute stage diet should be liquid or soft because of sore throat and pain during swallowing. Diet should be nutritious with high calorie, protein and Vitamins B and C and plenty of fluids (at least 2 to 3 litres a day). Fluids make the throat secretions thin so that they can be easily expectorated.
6. Patient education: It is important to counsel the patient:
  - to prevent the spread of infection by proper hand washing and proper disposal of used tissues

- to practise general hygiene measures e.g. hand washing to prevent re-infection.
- to rest the throat by not shouting or overusing the voice
- to drink a lot of warm fluids and eat nutritious meals
- to minimize exposure to irritants e.g. smoke, dust, occupational pollutants etc. by wearing face masks when there is risk of these irritants and also avoid cold.

### **Medical Management**

1. Antibiotics - acute viral pharyngitis is treated symptomatically since antibiotics are ineffective against viruses while acute bacterial pharyngitis is treated with sensitive antibiotics for at least 10 days. Penicillin is usually administered unless the causative organism is resistant to penicillin. Some physicians prescribe Clindamycin (Dalacin C) 150-300 mg t.d.s. for 5-7 days (adults and children over 12 years) or Azithromycin (Zithromax) for adults and children over 12 years.
2. Analgesics e.g. Aspirin 600mg 4 – 6 hourly (but not exceeding 4 grams daily) or Acetaminophen (Tylenol) 500mg – 1gm every 4 - 6 hours, are usually administered because of their analgesic and anti-inflammatory properties. Sometimes Paracetamol 500mg – 1gm is given every 4 - 6 hours.
3. Lozenges are given to moisten the throat and soothe sore throat.
4. Nasal congestion is relieved by short-term nasal spray containing ephedrine sulphate
5. Antihistamine decongestant is given if allergy is the cause of the inflammation.

***Treatment of chronic pharyngitis is based on relieving symptoms and avoiding irritants.***

### **Evaluation**

Effective treatment results in good outcomes e.g.

- Patient no longer experiences sore throat and headache
- Patient exhibits normal vital signs (temperature, pulse, respiratory rate and blood pressure). This is evidence that the infection has subsided. If the infection is not well treated, complications that may result include sinusitis, laryngitis, otitis media, peritonsillar abscess, mastoiditis and in rare cases pneumonia, rheumatic fever and nephritis.

### **4. LARYNGITIS**

**Definition:** This is inflammation of the larynx (voice box) or laryngeal membrane (vocal cords) It may be acute or chronic. It occurs as a result of voice abuse or as a part of upper respiratory infection. Sometimes there may be secondary bacterial infection of the inflamed larynx. Acute laryngitis tends to be more severe in the elderly and immuno-compromised persons.

**Causes: Acute Laryngitis** is caused by the following:

- Exposure and allergy to dust, chemicals, smoke and other pollutants, exposure to sudden temperature changes (especially from hot to cold)
- Vocal abuse (excessive use of the voice over time). This tends to produce oedema, inflammation and formation of nodules in the vocal cord.
- It may also be caused by allergic rhinitis or pharyngitis. Factors that cause immuno-suppression and immuno-compromise (e.g. malnutrition, dietary deficiencies and poor physical health) and compromised health status predispose the patient to laryngitis in the presence of other upper respiratory infections.
- Benign tumour of the vocal cord
- Gastro-oesophageal reflux disorder (GERD) where the oesophageal sphincter relaxes and gastric acid enters the oesophagus with aspiration into the larynx causing a chemical irritation of the mucosa lining the larynx.

**Chronic Laryngitis** is caused by:

- Repeated laryngeal infections
- Chronic exposure to irritants
- Long term voice abuse
- Long term reflux oesophagitis.
- Excessive use of tobacco or alcohol

### **Pathophysiology**

Inflammation of the vocal cord causes irritation, redness, swelling and soreness of the laryngeal membrane resulting in increased mucus production, fever, headache, sore throat, hoarseness of voice and severe cough. Oedema of the vocal cords also inhibits the normal movement of the vocal cords thereby causing it to make an abnormal sound.

### **NURSING PROCESS RELATED TO THE PATIENT WITH LARYNGITIS**

**Assessment:**

1. **Health History:** Health history may reveal recent change in the weather, possible allergy and recent nose and throat infection. The patient usually comes to the hospital with the history of sore throat, difficulty swallowing, cough, hoarseness of voice, fever, nasal stuffiness etc.
2. **Clinical Manifestations:** The signs and symptoms of acute laryngitis include sore throat, generalized discomfort, difficulty swallowing, cough, huskiness or hoarseness of voice or aphonia (complete loss of voice), fever, nasal stuffiness, headache, difficult phonation etc.

Chronic laryngitis manifests with persistent hoarseness of voice, severe chronic, irritating cough, painful or difficult phonation and a persistent tickling sensation in the throat.

### 3. **Physical Examination**

- **Inspection:** inspection of the throat reveals a red, swollen laryngeal membrane which sometimes spreads to the tonsils and adenoids.
  - **Palpation** of the neck elicits pain and tenderness.
4. **Diagnostic Examination:** Throat and nasal swabs for culture and sensitivity may reveal bacteria causing secondary infection

### **Nursing Diagnosis**

1. Acute pain in the throat related to laryngeal inflammation and irritation.
2. Hyperthermia (body temperature above 39° C) related to effect of infection of the larynx by bacteria or virus.
3. Imbalanced nutrition: less than body requirements, related to sore throat and difficulty swallowing.
4. Impaired verbal communication related to pressure on and irritation of the vocal cord by tumour. Impaired verbal communication may also be related to hoarseness of voice or by difficult phonation.
5. Anxiety related to loss of voice

### **Planning and Implementation**

Objectives of management include:

- To treat the infection
- To relieve pain and sore throat
- To prevent spread of the infection (by preventing hand-to-hand contact).
- To enhance communication

**The Nursing and Medical management of the patient with acute laryngitis are similar to that of acute pharyngitis.** The additional management strategies include:

1. Advise patient to get plenty of rest and sleep especially during the acute phase.
2. Instruct patient to avoid or reduce stress as much as possible and avoid irritants e.g. smoking or second-hand tobacco smoke and alcohol.
3. Relieve generalized discomfort, fever and pain through tepid sponging, use of hot fomentation or cold compress depending on which relieves pain in the patient.
4. Ensure adequate oral hygiene by brushing the teeth at least twice a day. This prevents mouth infection and promotes patient's comfort.
5. Instruct patient to rest the voice and refrain from speaking as much as possible. This allows the oedema of the vocal cords to subside; therefore provide writing material to help the patient communicate with people.
6. Medical treatment depends on the cause.
  - GERD is treated symptomatically by instructing the patient to elevate the head of the bed to prevent reflux, avoid eating heavy meals, avoid eating or drinking 2-3 hours before going to bed and avoid tobacco, caffeine and alcohol. Patient is also given antacids to neutralize gastric acid production.
  - Other medications include *expectorants* (to bring up laryngeal secretions), *analgesics* e.g. Acetaminophen with codeine (to relieve pain), *gastric acid inhibitors* e.g. Pantoprazole sodium (Protonix), Ranitidine HCL (Zantac) or Cimetidine (Tagamet). Antibiotics are administered in cases of superimposed bacterial infections.

**For Chronic Laryngitis,**

- Instruct patient to rest the voice and avoid smoking,
- Voice re-training may be necessary in cases of aphonia (voice loss)

- Patient should also inhale cool steam or use aerosol spray containing topical corticosteroids like beclomethasone dipropionate which reduces local inflammation but has no long term side effects.

### **Evaluation**

Patient outcomes include freedom from the signs and symptoms of infection and the ability to maintain a patent airway and communicate verbally without straining the voice.

## **5. LARYNGEAL CANCER**

**Definition:** This is a malignant tumour in the larynx (voice box) which occurs in three different areas of the larynx - the *glottis* (true vocal cords), the epiglottis or *supraglottis* (false cords above the vocal cords) or the *subglottis* (below the vocal cords). Two-thirds of laryngeal cancers occur in the glottis followed by the supraglottis (one-third of cases) and subglottis (less than 1 %). If detected/diagnosed early laryngeal cancers are potentially curable.

The incidence of laryngeal cancer is four times higher in men than in women and more common in older individuals (over 70 years of age).

### **Causes and Risk Factors**

- Carcinogens e.g. tobacco, alcohol, exposure to asbestos, paint fumes, wood dust, cement dust, tat products and other irritants
- Laryngeal problems e.g. chronic straining of the voice, chronic laryngitis

**Risk Factors** include riboflavin deficiency, familial disposition, weakened immunity, history of alcohol abuse etc.

### **Pathophysiology**

Squamous cell carcinoma of the larynx usually starts as a hard patch on the larynx which eventually ulcerates. Cancer on the glottis grows slowly because of limited lymphatic supply while those in supraglottis and subglottis grow fast because they have abundant lymphatic supply. As the cancer grows on the glottis, the vocal cords fail to close during speech thus causing hoarseness of the voice. Pressure on the surrounding tissues gives a sensation of foreign body in the throat,

dysphagia (pain on swallowing), neck pain, neck mass and eventually obstruction of the airway. Metastasis occurs in the lungs through lymphatic spread.

## **NURSING PROCESS RELATED TO THE PATIENT WITH LARYNGEAL CANCER**

### **Assessment**

- 1. Health History:** the patient may complain of hoarseness of voice, feeling of lump in the throat, persistent sore throat, all of more than 2 weeks duration.
- 2. Clinical Manifestations** – symptoms depend on the location of the growth.

Glottic tumour has the following early symptoms –hoarseness of voice, persistent sore throat, haemoptysis (coughing of blood) and pain in the throat especially when drinking hot liquids and citrus juices. Later in the disease there is dyspnoea, dysphagia, weight loss, change in voice sound and respiratory distress.

Supraglottic tumour manifests early with persistent unilateral sore throat, sensation of foreign body in the throat, dysphagia, neck mass, weight loss and haemoptysis. Later there is dyspnoea and pain in the throat which is referred to the ear.

Subglottic tumour has no early symptoms but at the late stage presents with dysphagia, dyspnoea, weight loss and haemoptysis.

**Change in voice sound is not an early sign of subglottic and supraglottic cancer.**

### **3. Physical Examination**

- **Inspection:** laryngoscopy (visual examination of the larynx with a laryngoscope) reveals the growth in the larynx and when the mobility of the vocal cord is assessed there is found to be limited movement of the vocal cords.
  - **Palpation of the neck** elicits the mass (swelling) which is painful at the late stage. Palpation of the lymph nodes of the neck determine the spread of the primary growth
- 4. Diagnostic tests:** biopsy (histological evaluation) of the tumour and CT scan or Magnetic Resonance Imaging (MRI) are used to

confirm the diagnosis. Staging of the cancer also helps in determining appropriate diagnosis and management framework.

- Stage 0: - no evidence of primary tumour and no regional lymph nodes metastasis.
- Stage 1: - tumour is 2 cm or less in diameter, is limited to one or more vocal cords and has normal mobility with no regional lymph nodes metastasis and no distant metastasis.
- Stage 2: - tumour is less than 3 cm, invades mucosa of the glottis, subglottis and subglottis with impaired mobility of the vocal cords but no lymph node or distant metastasis.
- Stage 3: - tumour is more than 4 cm in diameter but without regional or distant metastasis or
- primary tumour is 3 cm or more with metastasis in single ipsilateral lymph node (with dimension of less than 3 cm) but no distance metastasis. The tumour in stage 3 is limited to the larynx with vocal cord fixation and minor erosion of the thyroid cartilage.
- Stage 4a: - massive tumour of more than 4 cm in diameter with invasion of tissues beyond the larynx and extends through the thyroid or cricoid cartilage to the trachea and oesophagus. There is metastasis in single ipsilateral lymph node (with dimension of less than 3 cm) but no distance metastasis.
- Stage 4b: - tumour invades the prevertebral space and mediastinum to encase the carotid artery. Metastasis occurs in single or multiple ipsilateral lymph nodes with dimension of 3 to 6 cm in dimension.

**The prognosis of laryngeal cancer depends on the patient's age and gender, tumour stage, grade and depth of infiltration.** Small glottis tumours with no lymph node involvement have up to 75% to 95% survival rate and low recurrence after removal. Extensive tumours with metastasis have a lower survival rate and a high rate of recurrence.

### **Nursing Diagnosis (Pre-Operative)**

1. Chronic pain in the throat related to pressure of tumour on the structures of the neck.

2. Ineffective breathing pattern related to pressure of laryngeal tumour on the tracheo-bronchial tree.
3. Imbalanced nutrition: less than body requirements related to difficulty swallowing.
4. Impaired verbal communication related to pressure on and irritation of the vocal cord by the tumour.
5. Disturbed self image related to visible neck mass.
6. Anxiety related to diagnosis of cancer. It may also be related to impending surgery.
7. Knowledge deficit about surgical procedure.

**If the Patient is for Surgery, Post-Operative Nursing Diagnoses Include:**

1. Ineffective airway clearance related to physical alteration of the airway caused by presence of tracheostomy tube
2. Acute pain related to dissected nerves during surgery
3. Impaired verbal communication related to anatomical deficit secondary to removal of part or whole of the larynx.
4. High risk for wound infection related to loss of immune defences following malignancy
5. Imbalanced nutrition: less than body requirements related to swallowing difficulties following surgery.

## **Planning and Implementation**

### **Nursing Management (Pre-Operative)**

The nurse must prepare the patient appropriately for surgery or radiotherapy:

1. Explain to the patient the line of treatment ordered by the doctor e.g. surgery or radiotherapy. Also explain the expectations following the prescribed treatment e.g. possible disfigurement and inability to speak after surgery, possible radiation burns etc.

#### Assess

- The patient's current body weight, nutritional status, blood levels, haemoglobin and haematocrit etc.
- vital signs and any change in condition
- side effect of chemotherapy or radiotherapy

- usual coping strategies
2. Obtain informed consent
  3. Observe radiation safety by protecting the other parts of the body from exposure to radiation, keeping time of exposure to the barest minimum, proper and safe handling and disposal of radiation materials etc
  4. Give adequate nutrition (high calorie, high protein)
  5. Give support during alcohol withdrawal if patient is an active alcoholic as he would be required to stop drinking before surgery or radiotherapy.
  6. Explore and promote alternative methods of communication after surgery
  7. Get in touch with the speech therapist in preparation for after surgery. You need to work out with the patient how he will communicate after surgery.
  8. Give adequate psychological preparation by encouraging the patient to verbalise fears and anxieties and allaying them.

### **Post-Operative Management**

1. Adequate positioning i.e. semi-Fowlers to prevent aspiration
2. Maintain a patent airway by suctioning through the tracheostomy tube. The tube should be adequately cared for (see your notes on tracheostomy care in practical nursing and in your procedure manual)
3. Ensure adequate care of nasogastric tube
4. Promote and maintain adequate nutrition and fluids. Patient may not be allowed to eat or drink for 10 to 14 days after total laryngectomy (period may be shorter for partial laryngectomy); therefore nutrition and hydration are achieved through intravenous fluids and later when bowel sounds return, sips of warm water are given or if not tolerated enteral feeding is done through nasogastric tube. When the patient is ready to start oral feeding thick, bland liquids are used first because they are easier to swallow. You should explain to the patient that he may lose sense of smell and taste for some time after the surgery and so may not enjoy his food.

5. Assist the client to communicate using alternative methods e.g. writing, if literate.
6. Check the operation site for bleeding, care for the wound drains and dress wounds as necessary. Give adequate tracheostomy care. Drainage must be observed, measured and recorded by the nurse. Drains are usually removed by the doctor when the drainage is less than 50 to 60 ml /day.
7. If total laryngectomy was done with neck resection, there is need to inform the physiotherapist who will schedule for shoulder exercises in order to maintain normal shoulder function.
8. Reduce anxiety in the patient by providing patient with the opportunity to ask questions, express fears and anxieties, verbalize perceptions, concerns and feelings (e.g. anger, depression etc).
9. Promote a positive body image and self esteem
10. Support the patient and family
11. Monitor for signs of complications e.g. haemorrhage, respiratory distress, infection, wound breakdown etc.
12. Patient teaching: Patient should be told about certain self care activities e.g.
  - Meticulous oral care to prevent halitosis and infection
  - Not to stay in air-conditioned room as the air may be too cool or too dry and therefore irritating. The patient should therefore maintain adequate humidification.
  - To take plenty plain water or sugar-free liquids throughout the day.
  - To be careful when taking a bath to prevent the water from entering the stoma.
  - Proper care of the skin around the stoma
  - Avoidance of strenuous exercise

### Medical Management

1. *Treatment options* for laryngeal cancer are radiotherapy, surgery and chemotherapy and sometimes combination of radiation and chemotherapy or radiation and surgery may be employed. The modality selected depends on the staging of the tumour.

**Surgery** involves removal of part or whole of the larynx and the goals of surgery are to remove the tumour, maintain adequate physiological function and achieve acceptable self image. Type of surgery done depends on the location and staging of the tumour. For small tumours, laser surgery is done to preserve as much of the normal glottis as possible. Types of surgery include

- Partial laryngectomy is done for cancer of the vocal cord in which the affected vocal cord is removed, along with a portion of the larynx

leaving the airway intact. It is done in the early stages of cancer and results in a very high cure rate.

- Supraglottic laryngectomy is done for stage 1 and stage II tumours, whereby the glottis, false cords and hyoid bone are removed leaving the true cords, cricoid cartilage and trachea intact.
- Hemi-laryngectomy is performed when the tumour extends beyond the vocal cord but is limited to the subglottic area. The tumour is removed along with one true cord and one false cord.
- Total laryngectomy is done in advanced cancer of the larynx whereby the laryngeal structures, epiglottis, hyoid bone, cricoid cartilage and 2 or 3 rings of the trachea, are removed. This will result in permanent loss of voice. Sometimes a radical neck resection on the same side as the tumour is performed.

**Radiotherapy (radiation)** may be used before surgery to reduce the size of the tumour and after surgery to destroy any remaining cancer cells. Combination with chemotherapy (in advanced tumours), may be an alternative to total laryngectomy. Radiation therapy has several side effects including skin reactions, laryngeal necrosis, pain, dry mouth etc.

**Chemotherapy** involves giving alkylating agents e.g. Cyclophosphamide (cytoxan); antimetabolites e.g. Methotrexate and/or antitumour antibiotics e.g. Actinomycin-D. Side effects of chemotherapy include sore mouth, alopecia (hair loss), anorexia, nausea and vomiting, low white cell counts etc. ***Read up the actions, dosage, side effects and nursing implications of drugs used in the treatment of cancer.***

2. *Analgesics* are given for the relief of pain which is usually severe at the advanced stage.
3. *Haematinics* are given to build up the haemoglobin and haematocrit of the patient.

### **Post-operative Medical Management**

1. Analgesics are given to relieve pain
2. Antibiotics to prevent and deal with infection.
3. Drainage tube is removed when the drainage is less than 50 to 60 ml per day.
4. The laryngectomy tube is removed when the stoma is healed in 3 to 6 weeks after surgery. Since the patient may be discharged home before this, the nurse has to teach the patient how to clean and change the tube.

### **Evaluation**

Patient outcomes include the following:

- Patient exhibits no complications, and this may be achieved with proper management but sometimes patients develop respiratory distress, haemorrhage, infection and wound breakdown
- Patient exhibits positive self image, self esteem and self concept; but some patients may become depressed
- Patient acquires effective communication techniques through the use of assistive devices and with speech therapy is able to communicate effectively.

## **SELF ASSESSMENT EXERCISES 2**

1. Discuss the action, uses, adverse effects and nursing considerations of the following drugs used for upper respiratory infections.

- Promethazine HCL (Phenergan)
- Amoxicillin
- Acetaminophen (Tylenol)

2. Chudi, a 14-year-old boy is brought to the hospital with symptoms of sore throat, fever and loss of appetite. A symptom of acute pharyngitis is made.

- a) List, in order of priority, 4 nursing diagnoses for Chudi.
- b) Using any 2 identified nursing diagnoses; develop a nursing care plan for the first 48 hours of the care of this patient.

3. Upper respiratory infections may cause epistaxis (nose bleeding).

Refer to your notes on first aid (in foundations of nursing) and describe the causes, first aid, nursing and medical management and patient education for this condition.

4. Refer to any of the recommended textbooks and read up Tonsillitis and adenoiditis.

### **3.2 Medico-Surgical Conditions of the Chest and Tracheobronchial Tree (Lower Respiratory Tract)**

In the previous section you studied conditions affecting the upper respiratory tract. Most of these conditions were mild and may not require hospitalization unless complications occur. Unlike upper respiratory disorders, lower respiratory conditions are often serious and sometimes life-threatening. Most of these conditions are associated with severe chest pain, breathing difficulties and fever, all of which make the

patient very sick. The nurse is therefore required to give appropriate care in order to prevent life-threatening complications.

## 1. Bronchial Asthma

**Definition:** Bronchial asthma is a chronic inflammatory disease of the bronchial airways characterized by periods of bronchospasm, chest tightness, wheezing, dyspnoea, cough and mucus production. It differs from other obstructive diseases in that airway obstruction in asthma is largely reversible with treatment or spontaneously.

**Causes:** There are 2 main types of asthma – extrinsic (caused by allergies) and intrinsic (non-allergic). Allergic asthma usually begins in childhood while non-allergic asthma begins much later in life e.g. in adulthood. The causes of asthma are complex including immunologic, genetic, endocrine, psychological, biochemical and allergic factors. Causes and risk factors for allergic asthma include:

- 1) Allergy to pollen, mould, dust, grass, feather, fur, hair, fungi, smoke, perfumes, certain foods and medications, strong odours, wood dust etc.
- 2) Chronic exposure to airway irritants and air pollutants like fumes, smoke including cigarette smoke, dust, moulds etc.
- 3) Hereditary lack of beta-adrenergic stimulation which maintains bronchodilation.

Causes of **non-allergic asthma** include:

- 1) Long term emotional stress and tension resulting in the chronic release of acetylcholine which causes bronchoconstriction.
- 2) Upper respiratory infection e.g. common cold, viral rhinitis, sinusitis with postnasal drip, bronchitis
- 3) Nasal polyps

**Triggers include** - Weather change especially from hot to cold, damp climate; airway irritants, active/passive smoking, emotional stress and sometimes exercise.

### Pathophysiology

**In allergic asthma**, when the patient comes in contact with the allergen, the B lymphocytes are stimulated and eventually produce Immunoglobulin E (IgE) antibodies which attach to and activate the mast cells and basophils in the bronchial walls. These mast cells and basophils release chemical mediators (*histamine, bradykinin and prostaglandins*) which cause contraction of the smooth muscles of the

bronchial muscle (bronchospasm), reduce the diameter of the airway and increase reactivity of the airway. These activities result in airway mucosal oedema and increased mucous production.

**In non-allergic asthma**, when the causative factor is present e.g. emotional stress, the parasympathetic nervous system causes a release of *acetylcholine* which causes contraction of the smooth muscles of the bronchi and bronchioles. The sympathetic nervous system is also involved in allergic asthma by stimulating the mast cells and causing bronchoconstriction through the stimulation of the alpha-adrenergic receptors.

Once there is bronchoconstriction in both types of asthma, bronchospasm and bronchocongestion occur. These three factors result in increased mucus production by the hypersensitive airway and the mucus plugs the tiny bronchioles thus trapping distal air.

## **NURSING PROCESS RELATED TO THE PATIENT WITH ASTHMA**

### **Assessment**

- 1. Health History:** there is a history of sudden attack of chest tightness, cough and wheezing especially at night, following recent exposure to airway irritants, upper airway infection and change of weather conditions. Sometimes the patient may report a history of known allergy and recent exposure to allergens or may report a family history of asthma.
- 2. Clinical Manifestations:** asthmatic episodes usually start with a sensation of chest tightness followed by wheezing (first on expiration and later also on inspiration), non-productive cough and dyspnoea. Other symptoms include expiration that is prolonged and with marked respiratory effort, use of accessory muscles as work of breathing increases, tachycardia (abnormally rapid heart rate) and later on cyanosis (a late sign of poor oxygenation).
- 3. Physical Examination**

- *Inspection* reveals an anxious looking person with dyspnoea, wheezing and nasal flaring as respiratory effort increases.
- *Auscultation* of breath sounds reveals wheezing (especially during expiration) and tachycardia.
- *Percussion* of the chest produces hyper resonance

#### 4. Diagnostic tests

- Spirometry reveals decreased peak expiratory flow rate (PEFR), forced expiratory volume (FEV) and forced vital capacity (FVC). However the functional residual capacity (FRC) and total lung capacity (TLC) and residual volume are increased.
- Blood tests may reveal eosinophilia and high Immunoglobulin E in allergic asthma
- Blood gas analysis reveals abnormal blood gases (ABGs) e.g. hypoxemia (low oxygen) and respiratory alkalosis
- Chest x-ray may reveal hyperinflation.

#### Nursing Diagnosis

The nursing diagnoses in asthma include:

1. Ineffective breathing pattern related to swelling, constriction and spasm of the bronchial tubes secondary to inhaled irritants / allergy.
2. Ineffective airway clearance related to bronchospasm and excessive mucus production.
3. Anxiety related to respiratory distress (acute breathing difficulties).

#### Planning and Implementation (Management)

Objectives of management:

- To maintain a patent airway by relieving bronchospasm.
- To maintain effective gas exchange by providing adequate oxygen supply.
- To prevent chronic and troublesome symptoms (e.g. coughing and breathlessness in the night)
- To prevent complications especially status asthmaticus.

#### Nursing Management

Immediate relief of respiratory distress is necessary to prevent continued anxiety which aggravates the situation. At all times the nurse should deal with the patient calmly.

1. Assess and monitor the following in the patient:
  - Symptoms of airway distress by assessing respiratory rate, pattern and depth and changes in them
  - Breath sounds for wheezing
  - Cough for effectiveness and productivity and if productive, note the colour, amount and viscosity
  - Relationship of inspiration to expiration
  - For use of accessory muscles in breathing and for fatigue
  - Doctor usually orders for monitoring of ABGs to determine the effectiveness of treatment
  - Monitor for side effects of bronchodilator therapy

***Immediate care during an attack*** includes:

2. Encourage patient to maintain an upright position supported by pillows or Fowler's position whereby the head of bed is elevated 30 to 60 degrees above the level (that is prop up the patient). This improves respiration.
3. Keep warm and avoid chilling.
4. Loosen tight clothing around the neck, chest and waist.
5. Encourage patient to remain as calm as possible and give psychological support.
6. Encourage to breathe slowly and deeply and purposely make exhalation 2 times longer than inspiration.
7. Administer oxygen and prescribed medications, for example bronchodilators, and monitor patient's response to these.
8. ***Once the asthma attack is controlled*** there is need to explore and identify both the main cause and the extrinsic or intrinsic triggers. Treat the cause and help the patient identify any stressful lifestyle which should be avoided in the future.
9. The patient will have difficulty eating during the attack because of dyspnoea, but after the attack offer frequent small meals that are nourishing and plenty warm fluids.
10. Patient teaching on:
  - How to take medications as prescribed and use normal inhaler and metered-dose inhaler (MDI) correctly. Patient should first exhale fully and then inhale with a slow sustained breath.

- How to identify precipitating factors and avoid them
- How to recognize warning signals of an attack and what to do
- To maintain adequate hydration and nutrition and have adequate rest
- Also counsel patient to avoid smoking

### Medical Management

The immediate management of episodes of asthma depends on the severity of the condition which determines whether the patient can be treated as an outpatient or hospitalized. Asthma medications are either *quick-relief* (for immediate treatment of symptoms) or *long-acting* (to achieve and maintain control of persistent asthma). Severe episodes may constitute a medical emergency. Management of asthma involves giving:

- **Bronchodilators** which may be short-acting or long-acting. Emergency management of asthma involves giving of quick-relief medications e.g. inhaled short-acting selective  $\beta_2$ -adrenergic agonist drugs e.g. Albuterol (Proventil/Ventolin) through metered-dose inhalers (MDI) which consist of 2 puffs about 3 to 5 minutes apart. These relax smooth muscles of the airways with a short acting bronchodilator effect. The oral form is given 4 mg 2 to 3 times daily or a maximum single dose not exceeding 8 mg.
- **Anticholinergics** e.g. Isoetharine HCL, Ipratropium bromide (Atrovent). This can be used in conjunction with  $\beta_2$  adrenergic agents.

*If the asthma episode does not abate, long term medications are given e.g.*

- **Corticosteroids** e.g. hydrocortisone 200mg IV followed by Prednisolone 30 mg orally in 24 hours– these anti-inflammatory drugs may be given orally or parenterally to treat the primary infection that triggered the asthma
- **Mast cell stabilizers** e.g. Cromolyn sodium (Intal) 2 mg (2 puffs) 4 times a day by aerosol inhalation or 1 mg by metered dose inhalation.
- **Xanthine derivatives** e.g. Aminophylline 100 – 300 mg 3 to 4 times a day after meals or 200 – 500 mg (5 mg/kg body weight) by slow intravenous injection diluted in 10 to 20 ml water. Theophylline may be given in place of aminophylline.
- Long-acting  $\beta_2$ -adrenergic agonist agents e.g. sustained-release Albuterol
- Combination drugs e.g.  $\beta_2$ -adrenergic agonist and anticholinergic agent

**Note: the above drugs if given orally should be given with a full glass of water**

**Avoid antihistamine drugs as these dry pulmonary secretions.**

- Other medications include:
  - Antibiotics e.g. Clindamycin (Dalacin C) 150-300 mg t.d.s. for 5 days or Azithromycin (Zithromax) for adults and children over 12 years, may be given if chest infection is present.
  - Cough expectorants e.g. potassium iodide may be given to aid release of sputum.

If the patient develops status asthmaticus, maintain a patent airway, give oxygen and administer prescribed bronchodilators, steroids, antibiotics and fluids. **Never sedate the patient with status asthmaticus.**

## Evaluation

With effective treatment asthma can be reversed easily and the airways become free of secretions and the breath sounds normal. But if the treatment becomes ineffective, the following complications may result: status asthmaticus (a life threatening complication), worsening of hypoxemia, acute respiratory failure and pneumothorax (accumulation of air or gas in the pleural cavity resulting in collapse of the lungs), pulmonary hypertension and right-sided heart failure.

## 2. Bronchitis

**Definition:** Bronchitis is inflammation of one or more bronchi. It may be acute or chronic and frequently involves the trachea resulting in **Tracheobronchitis**. Acute bronchitis is more common and often serious in small children because their bronchi are smaller and more easily obstructed and also in the elderly and debilitated.

**Causes:** *Acute bronchitis* is caused by

- Upper respiratory infection especially of viral origin e.g. common cold which progresses to the chest, pertussis (whooping cough), measles;
- Bronchial irritation from excessive smoking and excessive tracheobronchial suctioning;
- Inhaling of noxious gases, organic dusts and chemical irritants e.g. industrial fumes, tobacco smoke, automobile exhaust and other environmental pollutants.

- Sometimes bacterial chest infections may be responsible. Common causative organisms in bronchitis are streptococci, pneumococci, haemophilus influenza.

**Chronic bronchitis** is a form of chronic obstructive pulmonary disease caused by chronic respiratory infections and chronic exposure to environmental pollutants and irritants.

### **Pathophysiology**

Inflammation of the bronchi causes irritation of the airway resulting in hypersecretion of mucus and initial dry irritating cough which later becomes productive. Continued bronchial irritation in chronic bronchitis:

- Results in hypertrophy and hyperplasia of bronchial mucous glands and mucus-producing goblet cells thus causing increased secretion by the bronchial mucosa.
- Chronic infiltration of the bronchial walls by leucocytes and lymphocytes.
- Makes the bronchial wall to become thickened and the bronchial lumen to become narrowed thus interfering with the flow of air to and from the lungs.

The narrowed lumen often becomes plugged with the mucus. The alveoli adjacent to the affected bronchiole may become damaged and fibrosed with increased airway resistance and severe ventilation-perfusion imbalance. Because of the inflammatory process, the patient has fever with accompanying chills, headache, and loss of appetite and chest muscle soreness.

## **NURSING PROCESS RELATED TO THE PATIENT WITH BRONCHITIS**

### **Assessment**

1. **Health History:** in acute bronchitis there is history of dry, irritating cough following an episode of common cold or exposure to environmental irritants. In chronic bronchitis history reflects a long-time smoker or person working in a heavily polluted environment with frequent upper respiratory infections and persistent productive cough for at least 3 months each year for 2 consecutive years along with recurrent chest infection.
2. **Clinical Manifestations (Signs and Symptoms)** – In *acute bronchitis* there is fever, chills, general malaise, headache, loss of appetite and initial dry irritating cough with scanty mucoid sputum.

The dry cough causes chest muscle soreness or frank chest pain which increases on coughing or exposure to cold. As the condition progresses, the cough becomes productive and may be blood-streaked in severe tracheobronchitis. The patient may develop tachypnoea (very rapid breathing), dyspnoea (shortness of breath) along with inspiratory stridor (coarse high pitched sound on inspiration) and expiratory wheeze all of which are heard during chest auscultation.

In **chronic bronchitis**, the persistent cough produces profuse purulent (pus-filled) sputum lasting at least 3 months each year for 2 consecutive years along with recurrent chest infection. There may be chronic obstruction of the bronchial tract due to fibrosis (thickening) and narrowing of the chronically inflamed tract.

### 3. Physical Examination

- On inspection the patient has cough which produces copious grey or yellow sputum and a variable degree of tachypnoea or dyspnoea and is seen to be using accessory muscles to breathe.
- On palpation there is positive pedal oedema and distension of neck veins if pulmonary hypertension results.
- On auscultation, breath sounds may elicit prolonged expiratory time and wheezing or râles (rhonchi) especially on inspiration

### 4. Diagnostic Tests

- Spirometry reveals decreased peak expiratory flow rate (PEFR), forced expiratory volume (FEV) and forced vital capacity (FVC). However the functional residual capacity (FRC) and total lung capacity (TLC) and residual volume are increased.
- Sputum culture reveals micro-organisms
- Arterial blood gas analysis reveals abnormal blood gases (ABGs) e.g. decreased PaO<sub>2</sub> (hypoxemia) and increased PaCO<sub>2</sub> respiratory alkalosis
- Chest x-ray reveals bronchoconstriction, hyperinflation and rounded diaphragm.

### Nursing Diagnosis

1. Ineffective breathing pattern related to swelling, constriction and spasms of the bronchial tract.

- Ineffective breathing pattern may also be related to increased airway resistance secondary to bronchospasm.
2. Ineffective airway clearance related to bronchospasm and excessive tracheobronchial mucus production.
  3. Activity intolerance related to inadequate oxygenation
  4. Acute pain in the chest related to dry irritating cough
  5. Imbalanced nutrition: less than body requirements related to loss of appetite. This may also be related to dyspnoea.
  6. Sleep pattern disturbance related to irritating cough
  7. Anxiety related to breathing difficulties

### **Planning and Implementation (Management)**

Objectives of management:

- To maintain a patent airway by relieving bronchial irritation
- To maintain effective gas exchange.
- To relieve chest pain.
- To prevent complications

### **Nursing Management**

1. Assess and monitor:
  - Respiratory rate, pattern and depth and note changes in them to identify any airway distress and altered breath sound. Report changes immediately.
  - Breath sounds for wheezing and râles
  - Cough for effectiveness and productivity and if productive note the colour, amount and viscosity of sputum.
  - Monitor for side effects of bronchodilator therapy
2. Encourage patient to rest adequately in a warm and well ventilated room in order to conserve energy. However alternate rest with daily activity as patient's condition improves.
3. Maintain an upright position or Fowler's position to ease breathing.
4. Encourage to breathe slowly and deeply
5. Encourage to eat light, nourishing diet high in protein (to replace loss in sputum), high calorie (to give energy), high vitamins B and C (to assist in healing), plenty fluids (to replace loss and reduce viscosity of sputum). Give small amounts of food at frequent intervals.
6. Administer medications and oxygen as prescribed and monitor patient's response to these.
7. Give psychological support.

8. Chest physiotherapy is useful and should be done. This involves chest percussion and vibration and postural drainage to mobilise and drain secretions. (**See section 3.2 of unit 2**). Therapy should be scheduled at least 1 hour before or after meals.
9. If the cough is too thick to be cleared by coughing, suctioning may be done to remove secretions along with humidifying the environment. Advise the patient to avoid cold environment.
10. Do steam inhalation to loosen thick mucus.
11. Ensure comfort by applying moist heat to the chest to relieve chest pain and doing steam inhalation. Tepid sponging is done to reduce body temperature in fever.
12. Patient education on:
  - Risk reduction – avoid smoking and inhaled irritants and blasts of cold air
  - Instruct on proper breathing exercises and postural drainage
  - Advise on high protein, high calorie diet with vitamins B and C and plenty fluids
  - Instruct on maintenance of humidified environment
  - Caution against overexertion which may induce a relapse or exacerbation of the disease.

### **Medical Management**

The medical management of bronchitis involve the use of:

1. Antibiotics - the sensitive antibiotic based on sputum culture is usually prescribed.
2. Cough expectorants may be prescribed if the cough is productive, but if dry and irritating antitussives (depress cough reflex) are given. Antitussives may be narcotic e.g. codeine linctus or non-narcotic e.g. Benylin, Romilar etc.
3. Inhaled mucolytic agents (reduce sputum or mucus viscosity and thus facilitate its removal by ciliary action or coughing) e.g. N-acetylcysteine (Mucomyst)
4. Bronchodilators to relieve bronchospasm and facilitate mucus clearance: forms used may be:
  - Beta-Adrenergic e.g. Albuterol (proventil, Ventolin), Salmeterol (Serevent) or
  - Anticholinergics e.g. Ipratropium bromide (Atrovent)
  - Methylxanthines e.g. Aminophylline or Theophylline

***See dosages of drugs in the management of bronchial asthma.***

5. Corticosteroids either in inhaled or parenteral form to minimize the inflammatory process.

6. Analgesics and antipyretics e.g. Paracetamol, Aspirin, Acetaminophen etc. to relieve pain and fever.

### Evaluation

Positive patient outcomes result from effective treatment of acute bronchitis. Chronic bronchitis may however progress into chronic obstructive pulmonary disease (COPD), cor pulmonale (right ventricular hypertrophy), pulmonary hypertension, lung fibrosis, bronchiectasis and broncho-pneumonia.

### SELF ASSESSMENT EXERCISES 3

Using the recommended reading texts read up and discuss the pathophysiology, symptoms and management of the following conditions:

- status asthmaticus
- bronchiectasis

### 3. CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

**Definition:** COPD refers to a group of diseases characterized by *irreversible limitation of airflow* into and out of the lungs. It is also commonly referred to as chronic airflow limitation (CAL). The diseases making up the condition include *chronic bronchitis, emphysema, cystic fibrosis and bronchiectasis*. Asthma was initially added to the list but contemporary description considers asthma as being characterized by primarily reversible airflow limitation. Recent textbooks however consider these disorders as different entities even though symptoms of the other disorders commonly coexist.

*Emphysema* is a condition that involves permanent hyperinflation and over distension of the air spaces beyond the terminal bronchioles so that the walls of the alveoli distal to the affected terminal bronchioles become inflamed and destroyed and trap pockets of air. This causes a reduction in the alveolar surface for gas exchange and thereby increases the ventilatory “dead space” resulting in impaired oxygen diffusion and hypoxemia.

*Bronchiectasis* is a chronic respiratory disease which causes permanent abnormal dilation and distortion of the bronchial tract. ***You are expected to read more about emphysema and bronchiectasis.***

COPD is usually a slow, progressive debilitating disease affecting those with prolonged exposure to respiratory irritants and a history of prolonged, heavy tobacco abuse. COPD is a leading cause of death in heavy smokers or those who work in places with heavy air pollution with respiratory irritants. Incidence increases with age. COPD occurs in stages – the stages and characteristics of COPD are shown on Table 2.1.

**Table 2.1 Stages of COPD**

Stage	Characteristics
Stage 0	normal spirometry, chronic cough and sputum production
Stage 1 (mild COPD)	FEV/FVC ratio is $< 70\%$ , FEV $\geq 80\%$ , chronic cough and sputum production may or may not be present
Stage 2 (moderate COPD)	FEV/FVC ratio is $< 70\%$ , FEV is between 30% and 80%, chronic cough and sputum production may or may not be present
Stage 3 (severe COPD)	FEV/FVC ratio is $< 70\%$ , FEV is $< 30\%$ , chronic cough, respiratory failure, signs of right heart failure

**Causes of COPD:** The exact cause of COPD is not clearly known but certain factors have been cited as contributing to its development. These include:

- A. Environmental exposures e.g.
  1. Respiratory irritants e.g. long term cigarette, cigar or pipe smoking (which destroys ciliary function, inflames and damages the bronchiolar wall and stimulates excess mucus production and

coughing). Exposure to tobacco smoke accounts for about 80%-90% of cases.

2. Chronic exposure to occupational and chemical irritants e.g. industrial fumes, passive tobacco smoke, automobile exhaust and other environmental pollutants.

B. Host risk factors e.g.

1. Genetic abnormalities e.g. deficiency of Alpha<sub>1</sub> antitrypsin (enzyme that protects lung parenchyma from injury). This makes the individual sensitive to environmental irritants and allergens.
2. Ageing process
3. Chronic respiratory infections including sinusitis, chronic bronchitis, nasal polyps, asthma etc.

**Pathophysiology:** In COPD, there is chronic irritation of the bronchial tubes by irritants and pollutants. This irritation causes inflammation and progressive narrowing of the smaller airways. With time the lung parenchyma becomes involved and obstruction in the bronchial tract limits airflow (chronic airflow obstruction). As the disease progresses copious amounts of sputum are produced and these are trapped in the dilated bronchioles and pockets of air. This limits lung capacity, prevents gas exchange and causes hypoxemia.

## **NURSING PROCESS RELATED TO THE PATIENT WITH COPD**

### **Assessment:**

1. **Health History:** A thorough nursing history is necessary to determine risk factors e.g. smoking. There is usually history of risk factors especially long term smoking, history of past respiratory disease including asthma, bronchitis, sinusitis, nasal polyps and environmental exposure etc. Patient complains of persistent cough (for months) accompanied by breathing difficulty and loss of weight and fatigue.
2. **Clinical Manifestations:** signs and symptoms depend on stage of the disease and include persistent productive cough, dyspnoea on exertion and patient rests frequently to rest when walking, weight loss, tachypnoea (rapid breathing), impaired / prolonged exhalation, abnormal breath sounds (wheeze or rhonchi) and fatigue.
3. **Physical Examination**

- *Inspection* reveals a “*barrel chest*” (increased anterior-posterior diameter of thorax), characteristic *COPD sitting posture* (leaning forward and using the intercostals, neck and shoulder accessory muscles to breathe thereby forcing the shoulder girdle upward), *obvious dyspnoea*, *increased work of breathing* and *distended neck veins* indicating strain on the right side of the heart.
- *Chest percussion* reveals hyper-resonant chest
- *Auscultation* reveals decreased breath sounds with rhonchi (dry whistle-like low-pitched sound) on inspiration and /or wheeze (whistling sound with a higher pitch) and loud prolonged expiratory phase.

#### 4. Diagnostic Tests

- Blood chemistry shows low alpha-1-antitrypsin, low partial pressure of oxygen (PaO<sub>2</sub>)
- chest x-ray shows hyper inflated lungs
- Pulmonary function tests help to confirm the diagnosis by showing decreased forced expiratory volume (FEV) and other pulmonary function tests. Results of these tests assist in determining the stage of the disease (**see table 2.1**)
- Spirometry evaluates airflow obstruction by determining the ratio of forced expiratory volume (FEV; that is the volume of air that the patient can forcibly exhale in one second), and forced vital capacity (FVC; that is maximum volume of air forcibly exhaled after maximum inspiration). *With obstruction, the patient either has difficulty exhaling or cannot forcibly exhale air from the lungs thereby reducing the FEV.* In COPD, the FEV/FVC ratio is less than 70%.
- Differential diagnosis must rule out other diseases of airflow limitation.
- Chest x-ray shows flat diaphragm and enlarged heart

#### Nursing Diagnosis

1. Ineffective airway clearance related to impaired exhalation. It may also be related to excessive secretions and ineffective coughing.
2. Ineffective breathing pattern related to bronchoconstriction and shortness of breath.
3. Impaired gas exchange related to increased dead space and decreased ventilation.
4. Imbalanced nutrition: less than body requirement related to increased metabolic need caused by increased work of breathing.
5. Activity intolerance related to fatigue caused by inadequate oxygenation of tissues.

6. Risk for infection related to retained secretions caused by dilation of terminal bronchioles.
7. Deficient knowledge of self care activities a home.
8. Anxiety related to breathing difficulties.
9. Altered family process related to chronic illness of family member

### **Planning and Implantation of Care (Management)**

Objectives of management include:

- To facilitate elimination of bronchial secretions.
- To treat respiratory infections
- To improve gas exchange and tissues oxygenation.
- To ensure adherence to the therapeutic programme and self care.

### **Nursing Management**

1. Encourage patient to maintain an upright position (45° to 90°) supported by pillows and leaning backwards.
2. Encourage patient to observe frequent rest periods and assist with care as much as possible. Gradually increase activity and encourage independence and self care as soon as patient develops activity tolerance.
3. Monitor:
  - vital signs especially respiration in terms of rate, depth and quality
  - level of activity
  - sputum for quantity, colour and consistency
  - nutritional status by recording food intake and checking patient's weight daily
  - monitor and manage potential complications especially life threatening respiratory failure, atelectasis, pneumothorax and cor pulmonale.
4. Encourage patient to breathe slowly and deeply and purposely make exhalation 2 times longer than inspiration.
5. Carry out frequent mouth care because coughing out sputum causes halitosis.
6. Nutrition and fluids: offer frequent small, easily digested meals that are nourishing and high in calorie, protein, Vitamin B and C and plenty fluids (up to 2 to 3 litres/day unless contraindicated).

7. Carry out chest physiotherapy - chest percussion and vibration and postural drainage. These help to mobilize and drain secretions from the lungs. These should be based on patient's tolerance. Deep breathing (especially diaphragmatic breathing) and controlled coughing should be encouraged during the process.
8. Administer oxygen as ordered. It should however be used with caution if the patient has emphysema. Note also that increasing the flow of oxygen to a high rate will suppress the respiratory drive; therefore the nurse should closely monitor the patient's respiratory rate during oxygen administration.
9. Encourage to carry out mild exercises which should be graded and take into consideration the patient's ability. Though exercises may not improve lung function, they however strengthen the muscles of the upper and lower extremities, enhance cardiovascular fitness and increase pulmonary ventilation.
10. Psychosocial support: This is important because the patient is prone to depression, altered mood states and social isolation. The nurse should encourage the family to give support, support patient to quit smoking, encourage him to verbalize anxieties and explore/ enhance coping strategies and abilities. Encourage to live as normal life as possible depending on limitations.
11. Pulmonary rehabilitation should be put in place. This involves breathing exercises, breathing re-training, behavioural change counselling, physical conditioning and activity pacing. Pulmonary rehabilitation is aimed at improving breathing patterns, increasing activity tolerance and promoting independence in activities of daily living (ADL) and self care.
12. Patient teaching on:
  - Risk reduction - encourage patient to stop smoking and avoid high altitudes, known allergens and respiratory irritants.
  - Breathing exercises - deep and diaphragmatic breathing and controlled coughing. Diaphragmatic breathing increases alveolar ventilation and FEV.
  - To adopt a lifestyle of moderate activity, avoidance of emotional stress and smoking cessation.

### **Medical Management**

1. Bronchodilators are given to relieve bronchospasm and airway obstruction. This ultimately improves ventilation of the alveoli. Bronchodilators may be given through metered-dose inhaler or nebuliser or orally.
2. Corticosteroids either in inhaled form or systemically. These are given for a short period of time.
3. Antibiotics e.g. Azithromycin to treat respiratory infections

4. Mucolytics e.g. Mucomyst to thin mucus secretions
5. Expectorants to facilitate removal of thick mucus from the lungs
6. Oxygen therapy especially when PaO<sub>2</sub> is very low.
7. Surgery is rarely done and this involves bullectomy, that is, removal of the large bullae (blister-like lesions) that compress the lungs and increase dead space.

### Evaluation

With adequate treatment the patient's condition improves with positive outcomes like achievement of maximal airway clearance, stable pulse oximetry and arterial blood gas values, improved breathing pattern, activity tolerance etc. However some complications may occur including pneumothorax, respiratory failure, atelectasis and cor pulmonale (pulmonary hypertension).

## 4. PNEUMONIA

**Definition:** Pneumonia is inflammation of the lungs parenchyma (substance) associated with consolidation and exudation. It is usually acute, may involve one or both lungs and may be primary or secondary (a complication of another disease).

**Causes:** Pneumonia is caused by:

1. Micro-organisms e.g. **bacteria**, either gram-positive or gram-negative (pneumococci, Haemophilus influenzae, pseudomonas aeruginosa, mycoplasma pneumoniae, Chlamydia, klebsiella), **viruses** (parainfluenza virus types A and B, adenovirus and conovirus in immuno-competent individuals and cytomegalovirus in immuno-compromised individuals), **fungi** (Aspergillus, histoplasmosis, cryptococcus) and **protozoa**. Fungi and protozoa are opportunistic organisms which attack when prolonged antibiotic or corticosteroid antineoplastic therapy suppresses the normal flora in the individual or in individuals with Acquired Immunodeficiency Syndrome (AIDS). Pneumonia caused by micro-organisms is infectious.
2. Aspiration of food, fluids, vomitus etc.
3. Inhalation of noxious materials like smoke, dust, gases
4. Upper respiratory infections
5. Chronic obstructive pulmonary disease (COPD)
6. Tracheal intubation (bypassing the upper airway) especially if unsterile instrument is used.

**Risk Factors** include cigarette smoking, immuno-suppression, malnutrition, alcoholism, prolonged debilitating illness, prolonged immobility, prolonged use of nasogastric tube, prolonged use of antibiotics and corticosteroids, aspiration of foreign or gastric material due to depressed cough reflex etc. The infection is more common in children, the elderly, debilitated and hospitalised patients (nosocomial or hospital-acquired pneumonia HAP).

### **Pathophysiology**

In normal circumstances, the upper respiratory tract, by its structure, is able to prevent potentially infectious particles from getting to the lungs and the normal flora in the tract also prevents this. But when the normal host defences are impaired, inhaled pathogenic organisms reach the lungs. On the other hand, if normal flora within the tract is altered or inhaled/aspirated to sites they are not normally present, they become pathogenic. Some organisms may get to the lungs through the blood stream. The presence of infective organisms in the lungs causes inflammation and irritation. Inflammatory reaction in the lungs parenchyma and alveoli produces mucosal oedema and formation of exudates that interfere with the diffusion of oxygen and carbon dioxide resulting in productive cough, dyspnoea, and possible cyanosis. In response to the inflammation white blood cells migrate into the alveoli and fill them.

In lobar pneumonia, a segment of the lung or an entire lobe of the lung is affected and become consolidated (solidified) by inflammatory material so that air cannot enter. In bronchopneumonia, inflammation involves and is localized in and around the terminal bronchioles which may go into spasms and become partially occluded with mucus with the lung alveoli being filled with patchy areas of infective tissues. The affected area is usually smaller than in lobar pneumonia.

### **Types of Pneumonia**

There are many types of pneumonia e.g. *lobar* (bacterial / typical), *broncho-pneumonia* (aspiration), *hypostatic*, *viral* (atypical). In recent years, because of HIV infection, opportunistic pneumonia (pneumocystis carinii pneumonia PCP) has also been identified. The characteristics of the various types are outlined in table 2.2.

## **NURSING PROCESS RELATED TO THE PATIENT WITH PNEUMONIA**

### **Assessment**

1. **Health History:** History of recent respiratory infection and other risk factors with symptoms like cough with brownish or blood-streaked sputum, chest pain and high fever with chills.
2. **Clinical Manifestations:** Pneumonia varies in clinical manifestations depending on the causative organisms. In lobar and viral pneumonia the onset of symptoms is sudden while onset is gradual in broncho-pneumonia and hypostatic pneumonia. Signs and symptoms include fever with chills (101° to 105° C), diaphoresis (excessive sweating), fatigue, chest pain (if pleurisy occurs), dyspnoea, cough with rusty, purulent or blood-streaked sputum, headache and delirium (if toxæmia occurs), tachycardia or bradycardia (if caused by pseudomonas) and tachypnoea with or without flaring of the alae nasae. Fever may subside by crisis (suddenly; in lobar and viral) or by lysis (gradually; in hypostatic pneumonia and broncho-pneumonia). In viral pneumonia, sore throat and nasal congestion occur.

**3. Physical Examination**

- *Inspection* reveals patient with a flushed face, tachypnoea, dyspnoea and in some cases flaring of the alae nasae.
- *Auscultation* reveals adventitious sounds e.g. crackle, wheeze or rhonchi in the lungs if the pleura are involved
- *Percussion* reveals a dense sound over areas of decreased ventilation caused by consolidation

**4. Diagnostic Tests**

- Sputum culture reveals the causative organisms
- Fibre-optic bronchoscopy confirms the type of pneumonia
- Blood culture to assess systemic spread elicits positive blood culture
- Blood test shows leucocytosis
- Chest x-ray is done to assess extent of lung consolidation and confirm the type of pneumonia

**Table 2.2 Comparison of the Types of Pneumonia**

Characteristic	Bronchopneumonia	Lobar pneumonia	Viral pneumonia	Hypostatic pneumonia
Causes	Often occurs in already damaged tract. Causes include: 1. Upper airway	Often occurs in previously healthy tract. Causes include: 1. Injury to	Often occurs in previously healthy tract. 1. Close contact with infected wild	Often occurs in previously healthy tract. 1. Prolonged immobilization resulting in

	<p>infections e.g. bronchitis, measles, pertussis etc.</p> <p>2. Aspiration of infected endogenous and exogenous materials into the lower airway</p> <p>3. Old age is a risk factor.</p>	<p>respiratory mucosa</p> <p>2. Exposure to colds and chills</p> <p>3. Invasion of the lungs by micro-organisms.</p>	<p>or pet birds and poultry.</p> <p>2. As opportunistic infection in AIDS</p>	<p>gravity acts of the lungs. Accumulation of fluid in the dependent parts. The stagnant fluid becomes good breeding ground.</p> <p>2. Poor blood supply to the lungs due to tight bandages on the chest.</p>
Mode of spread	<p>1. Through inhaled droplets</p> <p>2. Downward spread from nasal and throat infections</p> <p>3. Through aspiration</p> <p>4. Rarely through blood stream.</p>	<p>1. Through inhaled droplets</p> <p>Mainly through blood stream</p> <p>2. Through blood stream mainly</p> <p>3. Through exposure to cold and chills.</p>	<p>Through droplets (inhalation of infected feathers and bird droppings).</p>	<p>Nil</p>
Pathology	<p>Scattered patches of lung consolidation throughout both lungs. Bronchioles are affected but not pleura.</p>	<p>Consolidation in 1 or 2 lobes of 1 or both lungs. Pleura are affected but not the bronchioles.</p>	<p>Widespread infiltration in both lungs; pleura may or may not be affected.</p>	<p>May or may not be widespread; affects alveoli at base of lungs.</p>
Specific symptoms	<p>Gradual onset, dyspnoea not marked, no flaring of alae nasae, temperature subsides by lysis, toxicity rare.</p>	<p>Sudden onset, marked dyspnoea, flaring of alae nasae, temperature subsides by crisis, toxicity occurs often.</p>	<p>Sudden onset, marked dyspnoea, temperature subsides by crisis, toxicity.</p>	<p>Gradual onset, marked dyspnoea, moist cough and moist respiration, no toxicity.</p>

**Nursing Diagnosis**

1. Ineffective airway clearance related to copious tracheobronchial secretions
2. Impaired gas exchange related to lung consolidation with decreased surface area available for gas exchange.
3. Hyperthermia related to effect of bacterial invasion in the lungs
4. Acute pain in the chest related to coughing
5. Risk for fluid volume deficit related to excessive sweating caused by high body temperature
6. Risk for imbalanced nutrition: less than body requirements related to increased metabolic needs
7. Activity intolerance related to imbalance between oxygen supply and demand

### **Planning and implementation**

Objectives:

- To treat the lung infections
- To improve airway patency
- To improve gas exchange and tissues oxygenation.

### **Nursing Management (see Sample Care Plan in Appendix 1)**

1. Encourage patient to rest until the infection subsides in order to conserve energy, prevent unnecessary strain on the lungs and help to combat the infection. Pace activities to ensure rest.
2. Put patient in semi-Fowler's position to ease breathing or on the affected side to splint the side and relieve chest pain that occurs during coughing.
3. Give copious fluids to prevent dehydration that may occur following diaphoresis
4. Assist patient with coughing and deep breathing exercises to help remove mucus from the tract. Chest physiotherapy should also be done to mobilize and drain secretions.
5. Warm, moist inhalations should be done as these help in relieving bronchial irritation and also remove sticky mucus.
6. Monitor/assess vital signs 4 hourly noting rate and depth of respiration and use of accessory muscles in breathing. Observe sputum colour, amount and odour; frequency and severity of cough and degree of shortness of breath etc.

7. Diet should be liquid at first then progress to light diet containing high amount of calories, protein, carbohydrate, vitamin B and C and copious fluids. It should be given in small amounts at frequent intervals.
8. Comfort care: tepid sponge when feverish; apply hot compress to the chest to relieve pain, change gown when sweat makes it wet; give frequent mouth care to combat dryness and cracking and keep the mouth fresh from foul tasting and smelling secretions.
9. If hypoxemia develops oxygen is administered and should be monitored adequately

### Medical Management

1. The treatment of viral pneumonia is usually symptomatic, but for pneumonia caused by other organisms, appropriate antibiotics are given as determined by the result of culture and sensitivity test. Common antibiotics given are penicillin, Erythromycin, Azithromycin, Augmentin etc.
2. Bronchodilators as given as necessary
3. Analgesics and antipyretics - Paracetamol (Panadol), Acetaminophen, Aspirin, Analgin
4. Antitussives or expectorants
5. Oxygen therapy

### Evaluation

With treatment airway patency improves and sputum production diminishes indicating resolution of the infection. If the infection does not resolve complications like atelectasis, respiratory failure, lung abscess etc may result.

## 5. Pulmonary Tuberculosis

**Definition:** Pulmonary tuberculosis is a chronic infectious disease that primarily affects the lung parenchyma but may also spread to other parts of the body including the bones, lymph nodes and meninges.

**Causes and Mode of Transmission:** The causative organism is Mycobacterium tuberculosis (tubercle bacilli), which is an aerobic acid-fast, rod-like organism that *grows slowly*. Pulmonary tuberculosis is closely associated with HIV infection and is the leading cause of death in HIV-positive individuals. TB spread from person to person is by airborne transmission through inhalation of droplets dispersed by sneezing, coughing, talking etc; and risk factors include overcrowding, substandard housing, malnutrition, immuno-compromised status and substance abuse (alcohol, cigarette smoking). Spread may occur rapidly

in health care settings unless the nurse puts in place certain precautionary measures e.g. identification and treatment of cases and source control through isolation precautions.

### **Pathophysiology**

When the bacilli are inhaled, they are transmitted through the airways to the lungs where they are deposited in the alveoli and begin to multiply. This sets up an inflammatory reaction with the formation of exudates which accumulate in the alveoli causing broncho-pneumonia. Immune response also occurs in the area of the lung with the primary infection causing leucocytes to engulf and destroy the bacilli and the formation of granuloma (colonies of new tissues containing live and dead bacilli) two to ten weeks after initial exposure. Macrophages later surround the granuloma and form a protective (self limiting) wall around it thus “walling off” the bacteria. This granuloma later becomes fibrosed with a central portion known as Ghon focus or Ghon tubercle. With time the tissue within the tubercle becomes necrotic, forming a cheese-like material called casein. The bacilli are also carried through the lymph system to the hilar lymph nodes where immune response also occurs.

If the immune system of the individual is effective at this stage, the tubercle becomes calcified and may be absorbed, the bacteria within the granuloma remain dormant and there is no further progression of the disease. However the presence of the Ghon tubercle elicits a positive result for tuberculin test (Heaf or Mantoux). If however the immunity is compromised or there is re-infection, the Ghon tubercle ulcerates and releases the liquefied cheesy material (casein) into the bronchi (active disease results) and this is exhaled into the air as droplets. The casein then spreads to the other lung, the brain, kidney or bone marrow. The ulcerated tubercle heals with scar tissue causing further inflammation in the infected lungs.

## **NURSING PROCESS RELATED TO THE PATIENT WITH PULMONARY TUBERCULOSIS**

### **Assessment**

- 1. Health History:** Patient usually reports to hospital with a history of low grade fever, night sweat, anorexia, weight loss, chest pain, fatigue and cough that produces muco-purulent or blood-stained sputum; all lasting for weeks or months.
- 2. Clinical Manifestations:** The onset of signs and symptoms of pulmonary tuberculosis is gradual and symptoms include fatigue, low grade fever (especially in the late afternoon or early evening),

night sweat, anorexia, weight loss, enlarged lymph nodes, and chest pain with or without dyspnoea and persistent cough which may be either non-productive or productive with muco-purulent sputum. Sometimes haemoptysis (coughing out blood) may occur.

### 3. Physical Examination

- *Inspection* reveals an individual with severe weight loss
- *Auscultation* of breath sounds reveal diminished bronchial sounds; rhonchi and crackles
- *Percussion of the chest* reveals dullness of chest sounds
- *Palpation*: the enlarged lymph nodes can be palpated.

### 4. Diagnostic Tests

- Tuberculin skin test (Mantoux or Heaf) whereby tuberculin (purified protein derivative of tubercle bacillus extract) is injected into the skin and 48 to 72 hours later, the area is examined for induration (wheal or hardening) and the size of the hardened area is measured. A wheal of 5 millimetres or more signifies that the person has been exposed to the tubercle bacilli but may not mean that the individual has the active disease. If the wheal however ulcerates this is a positive result for active TB.
- Sputum culture may reveal the tubercle bacilli
- Sputum test for acid-fast smear reveals the presence of *Mycobacterium tuberculosis*
- Chest x-ray shows areas of lung infection with the Ghon tubercle evident
- Bronchoscopy also shows areas of bronchopneumonia (lesions in the bronchi and lungs).

### Nursing Diagnosis

- a. Ineffective airway clearance related to mucopurulent bronchial secretions.
- b. Activity intolerance related to fatigue
- c. Altered physical comfort related to night sweat
- d. Imbalanced nutrition: less than body requirement related to loss of protein in sputum.

It may also be related to high metabolic needs or to anorexia.

- e. Knowledge deficit (treatment regime and compliance).

## **Planning and implementation**

The objectives of treatment are:

- To maintain a patent airway
- To increase tolerance to activities of daily living
- To increase knowledge about the disease and the treatment regimen
- To enhance adherence to treatment regimen
- To prevent spread of infection to other people and spread to non-pulmonary sites in the patient's body

*In order to prescribe appropriate treatment, patients with tuberculosis are classified as follows:*

- New case - one who has never taken treatment for TB
- Treatment failure - patient who has a positive smear 5 months or more after commencement of treatment
- Relapse - patient who previously received treatment and was declared cured or had completed full course of treatment but later developed a positive sputum smear once again.
- Treatment defaulter - patient who completed at least one month of treatment and later defaulted but returns with a positive smear after at least 8 weeks of interruption.

## **Nursing Management**

1. Maintain isolation practices for the patient especially in active disease. This is because spread of the infection is prevented through acid-fast isolation precautions until there is clinical evidence of reduced infectiousness.
2. Encourage rest and instruct patient on correct positioning that will promote airway clearance and enhance gas exchange.
3. Improve nutritional status by encouraging patient to eat meals high in calorie, protein, vitamins especially B and C and giving copious warm fluids (to promote systemic hydration and encourage effective expectoration). Patient should be given vitamin supplements (Vitamin B<sub>1</sub>) to minimize the risk of peripheral neuropathy and also given high-calorie nutritional supplements as a strategy for increasing dietary intake.
4. The treatment strategy used for new patients is usually Directly Observed Treatment Short course (DOTS) and for relapse cases DOT long course. Advise patient on treatment strategy, teach the

treatment schedule and what it involves and counsel to adhere to treatment regimen and explain the danger of non-compliance; also explain about side effects and how to deal with them.

***Ask patient if he is taking birth control medications, anti-epileptic medications, corticosteroids, oral anti diabetes drugs, oral anti-coagulants and antiretroviral drugs. If yes to any of the above refer to the doctor.***

5. Educate patient on positive health habits e.g. cover mouth and nose when coughing and sneezing, properly disposing used tissues and appropriate hand hygiene.
6. Assess and monitor the patient in relation to:
  - Vital signs especially in relation to changes in respiratory status and spikes in body temperature.
  - Potential complications
  - Side effect of medication therapy e.g. hepatitis, hearing loss, rashes etc.
  - Symptoms of drug resistance e.g. non-improvement in symptoms despite treatment
7. Patient teaching on:
  - How to take the medications: take on empty stomach or 1 hour after meal because food interferes with absorption of the drug.
  - What foods to avoid e.g. foods containing tyramine and histamine (e.g. tuna fish, soy sauce, cheese, yeast extracts and red wine) if taking INH.
  - What foods to take to improve nutritional status e.g. high protein, high calorie.
  - Other things to avoid in order to prevent drug reactions e.g. alcohol and phenytoin if taking INH; and beta-blockers, oral anticoagulants, corticosteroids, oral contraceptives, digoxin, theophylline if taking Rifampin.
  - How to prevent infection to others in the home by covering mouth during coughing and sneezing, proper disposal of used tissues used to collect sputum, adequate hand washing, adequate ventilation in the home, prevention of overcrowding etc.
  - Need to adhere to treatment regimen in order to prevent development of resistance strains of the bacteria. To increase adherence patients are usually referred to the outpatient clinic for daily administration of medications (referred to as directly observed therapy DOT).
8. Contact tracing should be done in the patient's household/family and immediate community for screening and surveillance. This is

done to ensure early identification and treatment of persons with TB and BCG immunization to those with a negative Mantoux test prevent the infection.

### Medical Management

Effective treatment of TB is achieved through DOT (Directly Observed Treatment). DOT means that the patient swallows the tablets under the supervision of a health worker or designated community member. For new cases therapy is short course (Directly Observed Therapy Short course) while it is long course as retreatment for relapses, failures and return after default cases. Pulmonary TB is treated primarily with:

1. Chemotherapeutic drugs that specifically destroy the tubercle bacilli (antituberculosis drugs). The treatment is usually prolonged e.g. for 6 to 12 months, to ensure complete eradication of these slow growing bacilli and prevent relapse. Examples of these medications include:
  - First line anti-TB drugs like *Isoniazid* (INH) 100 mg daily, *Rifampicin* (RIF) 150 mg daily, *Streptomycin* (S) 1 gm daily (this should not be given to pregnant women and in patients older than 45 years only 0.75gm should be given), *Ethambutol* (E) 400 mg and *Pyrazinamide* (PZA) 400 mg daily.

Combinations of these may also be given e.g. INH + RIF; INH + E; S + PZA; INH + PZA + RIF + E or INH + RIF + S. The recommended treatment guidelines for newly diagnosed patients consist of an initial intensive multiple-medications regimen (usually INH + rifampin + streptomycin) daily for about 8 weeks, and if there is positive response streptomycin is discontinued and the other combinations are administered twice a week for the next 4 to 8 months.

Common side effects of first-line medications include nephrotoxicity, skin rash and damage to 8<sup>th</sup> cranial nerve resulting in impaired hearing; peripheral neuritis, hepatitis and elevation of hepatic enzymes like AST (SGOT), ALT (SGPT). Hepatic enzymes should be monitored every 2 weeks initially and later every 4 to 6 weeks.

- Second line anti-TB drugs like para-aminosalicylate sodium (PAS), capreomycin, ethionamide and cycloserine may be prescribed if there is resistance to one or more of the first-line medications in the form of primary resistance (in a person who has not had previous treatment) or secondary resistance (in a person who is undergoing therapy).

2. Pyridoxine (vitamin B) is given if the patient is on long term therapy with rifampin. This is to prevent INH-related neuropathy.
3. Haematinics are given to build up the blood and serve as diet supplements.

### **Evaluation**

Expected patient outcomes include reduction in coughing, adherence to treatment regimen and non-spread of infection to non-pulmonary sites.

If therapy is ineffective or treatment started late or patient develops resistance to medications certain complications may result e.g. lung abscess, spread to other sites resulting in miliary TB, TB osteomyelitis etc.

### **SELF ASSESSMENT EXERCISES 4**

1. Discuss the similarities and differences between lobar pneumonia, bronchopneumonia and hypostatic pneumonia.
2. DOTS is a form of therapy used for new cases of pulmonary tuberculosis. Explain the modalities involved in DOTS for newly diagnosed patients with PTB.

### **4.0 CONCLUSION**

Having completed the course material on this unit, you are expected to have understood the common disorders affecting the upper and lower respiratory tracts, their pathophysiology and how to recognize and manage them using the nursing process approach. You are also expected to have read your notes on the related anatomy and physiology of the respiratory tract in order to help you understand the pathophysiology of the conditions.

### **5.0 SUMMARY**

This unit has discussed the causes, pathophysiology and treatment of medical and surgical conditions of the upper and lower respiratory tracts using the nursing process approach.

### **6.0 TUTOR-MARKED ASSIGNMENT**

- a) With a large labelled diagram, describe the larynx.

Mr. Ezekiel, a 62-year-old cement factory worker, is seen in hospital with a history of sore throat, cough, and hoarseness of voice, anorexia and difficulty swallowing all of 2 weeks duration.

Inspection of the throat reveals a red, swollen laryngeal membrane and palpation of the neck elicits pain and tenderness. The doctor suspects laryngitis and starts treatment.

- b) List 5 nursing diagnoses that can be made for Mr Ezekiel and using any 3 in order of priority, draw up a nursing care plan for this patient.

After one week, the patient's symptoms persist and patient starts coughing up blood (haemoptysis). A biopsy is done and result reveals cancer of the larynx. Dr decides on surgery (partial laryngectomy).

- c) Discuss the post-operative care that may be given to Mr. Ezekiel.

#### 7.0 REFERENCES/FURTHER READINGS

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## **UNIT 2 ASSESSMENTS, DIAGNOSTIC PROCEDURES AND COMMON INTERVENTIONS FOR RESPIRATORY DISORDERS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Physical Assessments and Diagnostic Procedures for Respiratory Disorders
  - 3.2 Common Interventions for Respiratory Disorders
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

For effective management of conditions affecting any system of the body, there is need for appropriate diagnosis to be made. This is even more critical in respiratory conditions because of their life-threatening nature. Appropriate diagnosis may be made through consideration of health history and signs and symptoms presented by the patient; through physical assessments and diagnostic tests carried out on the patient. This unit considers the physical assessments and diagnostic tests and procedures carried out on patients with respiratory diseases.

### **2.0 OBJECTIVES**

After going through this unit, you should be able to:

- explain the physical assessments that can be done on the patient with respiratory disorders
- explain the diagnostic tests and procedures that may be carried out to diagnose respiratory disorders
- identify the nursing implications of the various assessments and diagnostic procedures for upper and lower respiratory disorders
- recognize abnormal results from assessments and diagnostic tests in order to put in place prompt interventions to deal with them
- describe the interventions that can be carried out to relieve symptoms in patients with respiratory disorders.

### 3.0 MAIN CONTENT

#### 3.1 Physical Assessments and Diagnostic Procedures for Respiratory Disorders

There are several routine physical assessments and diagnostic tests carried out in the diagnosis of respiratory disorders.

**PHYSICAL EXAMINATION:** The physical assessments done during physical examination are inspection, palpation, percussion and auscultation.

**Inspection:** Inspection of the upper respiratory system includes:

1. Observation of the respiratory rate, depth and pattern. Normal respiration (breathing) is regular in rate, depth and pattern (rhythm). Except for occasional sighs, normal respiration is neither too deep nor too shallow in depth, is regular in rhythm and has a rate that is neither too fast nor too slow. This normal pattern of respiration is called *eupnoea*. The normal respiratory rate is between 16 and 22 per minute (some experts say it is 12 to 18) in normal adults at rest, but is higher in the young (20 to 30 in children and 30 to 50 in the newborn). In disorders of the respiratory system, the respiration is affected in rate, rhythm and depth. Because of the airways are obstructed in disorders of the upper respiratory tract, the breathing is usually shallow in depth and faster in rate. In conditions of the bronchi and lungs especially those with distress, the breathing is usually laboured with alteration in rate, depth and rhythm because of increased airway resistance.

Abnormalities in respiration that may be found in respiratory disorders include:

- **Dyspnoea** (laboured or difficult breathing or shortness of breath) occurs in asthma, COPD, pneumonia etc.
- **Tachypnoea** (rapid breathing) is seen in patients with pneumonia, pulmonary oedema and fracture of the ribs.
- **Hypoventilation** (decrease in depth and rate of respiration with shallow, irregular breathing) occurs in asthma, COPD, bronchitis
- **Hyperpnoea** (increase in depth of respiration) and **hyperventilation** (increase in both depth and rate of breathing) are common phenomena in respiratory disorders, especially where there is increased airway resistance or decreased lung compliance.
- **Apnoea** (cessation of breathing) may occur in severe respiratory disorders and if sustained/prolonged it is life-threatening.

The presence of any of the above breathing abnormalities is an indication of problem that needs immediate intervention.

2. Inspection of the nasal orifices is done to check for inflammation, congestion and presence of polyps using a nasal speculum (for nasal problems). In normal conditions these abnormalities are absent. The throat is also inspected to identify physical abnormalities in the pharynx and larynx e.g. enlargement, mass etc.
3. Endoscopy (examination using endoscope) is done to directly visualise different areas of the respiratory tract e.g. examination of the oropharynx and larynx using the laryngoscope, examination of the trachea and bronchi using a bronchoscope and of the pleural cavity through fibre optic thoracoscopy. No matter which area the instrument is inserted, endoscopy helps to identify abnormalities in the structure of the organs of the respiratory tract.
4. Transillumination and examination of the sinuses.

#### For **Lower Respiratory Disorders,**

5. The chest wall is also inspected for size, contour and symmetry to identify any deformities e.g. thoracic kyphoscoliosis, barrel chest, funnel chest, pigeon chest etc.
6. Chest movement is observed during respiration for depth of expansion and rhythm and to note the use of accessory muscles if present.

**Percussion:** Thoracic percussion is done to determine whether the underlying tissues in the thoracic cavity are filled with air, fluid or solid material. It may also be used to estimate the size and location of the heart and lungs. Percussion should be done systematically starting from the apex of the lungs (top of the chest) to the base (diaphragm) and moving from the posterior area (back) of the chest to the lateral (side) and then to the anterior area (front). It should be done with the patient sitting upright with the arms crossed (for the posterior part) or lying supine (for anterior thorax). Air-filled areas should be resonant while areas filled with fluid or mass should elicit dullness on percussion. Hyper-resonance however occurs when too much air is present within the pleura or chest wall e.g. in emphysema and pneumothorax. Dullness over the heart area is a normal finding but dullness over the lungs signifies the presence of fluid or solid mass or areas of consolidation.

**Auscultation:** Auscultation of the chest wall is done to assess the presence or absence of normal breath sounds. Normal breath sounds vary in pitch and intensity depending on the area of the auscultation. Over the trachea and bronchi the sound is normally loud with a high pitch, while it is soft and low pitched over the vesicle (entire lung field).

Abnormal breath sounds identified on auscultation include *rales (crackles)* which are common in pneumonia, bronchitis, bronchiectasis and pulmonary fibrosis; *wheeze* occurs in asthma and bronchitis; *rhonchi* (gurgling sounds or dry whistle-like noises with a lower pitch than a wheeze) occur most commonly in diseases with excess mucus production e.g. pneumonia, bronchitis and bronchiectasis and *friction rubs* (a creaking or grating sound) are commonly heard in pleuritis / pleurisy, pleural infarct and pneumonia. Apart from eliciting abnormal breath sounds, breath sounds may be diminished or absent when airflow is decreased or air passages are fluid-filled.

**Palpation:** Palpation of the neck and chest wall is done to check for masses, crepitus (crackling sound heard on auscultation), deviations from the midline, tenderness and swelling and thoracic excursions. Thoracic excursion assesses the degree and symmetry of chest movement. Any tenderness, pain, discomfort, masses, swelling, crepitus or deviations in the neck or chest wall indicate respiratory abnormalities.

## DIAGNOSTIC TESTS AND PROCEDURES

Diagnostic procedures in respiratory conditions augment other physical assessments and involve a wide range of diagnostic studies including:

- 1. Pulmonary Function Tests:** These are done to assess respiratory function and determine the degree of respiratory dysfunction. Lung function is viewed in terms of lung volumes (tidal volume and the reserve volumes both inspiratory and expiratory, forced expiratory volume per second (FEV<sub>1</sub>)) and lung capacities e.g. total lung capacity (TLC), forced vital capacity (FVC), inspiratory capacity, FEV: FVC ratio and functional residual capacity. These are done using a spirometer. *The description, symbol, measurement and implication of these volumes and capacities are in the domain of respiratory physiology. You should therefore go back to the study material on physiology and review them.*
- 2. Arterial Blood Gas (ABG) Analysis:** measurements of blood pH, arterial oxygen tension (PaO<sub>2</sub>) and arterial carbon dioxide (PaCO<sub>2</sub>) are important in respiratory disorders, especially when the patient is receiving oxygen therapy. The analysis helps to assess the ability of the lungs to provide adequate oxygen to the tissues and remove excess carbon dioxide. Arterial oxygen tension indicates the degree of oxygenation of the blood and efficiency of gas exchange (ventilation-perfusion), while the arterial carbon dioxide tension indicates adequacy/ effectiveness of alveolar ventilation and ability to remove carbon dioxide from the blood. PaO<sub>2</sub> below 80 mm Hg indicates hypoxia while PaCO<sub>2</sub> above 50 mm Hg indicates

hypoventilation. Serial ABG analysis (done many times over a period of time) may be necessary to elicit a pattern.

3. **Pulse Oximetry** monitors oxygen saturation of the haemoglobin (blood oxygenation) in order to identify changes in blood oxygen saturation. It is a non-invasive method whereby a sensor with a meter (oximeter) is attached to the fingertip to detect oxygen saturation. Normal values of oxygen saturation are 95 to 100% while values below 85% indicate that the tissues are not receiving enough oxygen.
4. **Culture of Throat Swabs and Sputum** for bacterial growth and sensitivity is a diagnostic test when respiratory disease produces exudates and secretions. Identification of the causative organism (pneumococcus, mycobacterium tuberculosis, etc) helps in diagnosis of the disease.
5. **Examination of the Pleural Fluid** for total protein, pH, presence of acid-fast bacilli and cytology
6. **Imaging Studies** e.g. chest x-ray, computed tomography (CT) scan (using narrow-beam x-ray) or magnetic resonance imaging MRI (using radiofrequency signals) are done to identify areas of densities and masses.
7. **Biopsy** (excision) of a small part of tissues in any part of the tract for cytology reveals whether diseased tissues are malignant or not.

## NURSING IMPLICATIONS OF DIAGNOSTIC TESTS

The nurse has some important roles and responsibilities towards the patient undergoing diagnostic tests and procedures. Specific actions depend on the procedure/test but generally actions involve giving information about the procedure/test, obtaining informed consent in some tests, adequate collection of specimens, adequate positioning in some tests, monitoring of vital signs before, during and after the procedure; monitoring for side effects and complications and withholding of foods and fluids if the procedure involves anaesthetic (as in endoscopy) etc.

## SELF ASSESSMENT EXERCISES 1

1. After bronchoscopy and lung biopsy, Mr. Edu experiences haemoptysis and dyspnoea. What would be your actions in this situation?
2. Describe the observations you should make and care you should give to a patient after lung biopsy?

### 3.2 Common Interventions for Respiratory Disorders

There are several interventions that may be carried out for patients with respiratory conditions. *These will be discussed only briefly in this course because you would have done them in the course on foundations of nursing and clinical nursing procedures.*

#### 1. Positioning

Correct positioning of patients is essential for not only maintaining body alignment and ensuring comfort, but also for maintaining a patent airway. People with respiratory problems usually have difficulty breathing especially when lying down. Adequate positioning (elevating the head) enables the patient to breathe more easily because it promotes expansion of the lungs and ensures better contraction of the respiratory muscles. Suitable positions for patients with respiratory problems include sitting upright, sitting and leaning backwards (semi-Fowler's), leaning forward in sitting position and forward leaning in standing position.

#### 2. Suctioning

Suctioning is a common nursing intervention whereby a catheter inserted into the nose or mouth is used to remove thick, tenacious secretions from the nose, mouth and tracheobronchial tree. It also stimulates productive coughing. A sterile catheter of appropriate size attached to the suction machine is passed into the nose (nasopharyngeal suctioning), or mouth (oropharyngeal suctioning) or trachea (nasotracheal suctioning) or endotracheal tube or tracheostomy tube as the case may be. Then the suction machine is put on to create a suctioning pressure that sucks out mucus and other secretions. Two methods of suctioning may be used - using wall unit suction machine with a separate catheter or Closed-system suctioning (in-line suction catheter covered with plastic sleeve also attached to suction machine). In-line method allows rapid suctioning without interrupting ventilation or oxygenation. For newborn babies suctioning may be done using a bulb syringe. Before suctioning you should place the patient in appropriate position (semi-Fowler's or dorsal recumbent position with the head tilted backwards) to keep the airway patent. Limit suctioning to 10 seconds at a time to prevent interruption in oxygen intake and excessive removal of oxygen which may result in hypoxemia. Allow 3 minutes between suctioning so that patient can breathe deeply and so prevent hypoxemia. Suctioning has some complications if not well handled e.g. bronchospasm, introduction of infection into the lower respiratory tract, airway trauma, and hypoxemia. Therefore you should

be prepared to quickly give supplemental oxygen if respiratory distress occurs.

**Read up your notes on procedures to identify the principles that must be observed during suctioning.**

### 3. Chest physiotherapy

Chest physiotherapy consists of physical manoeuvres that include chest wall percussion, vibration and shaking and postural drainage (appropriate positioning to mobilize secretions).

- Aim of chest physiotherapy: chest physiotherapy is done to mobilize from different areas of the lungs, facilitate clearance of retained secretions and improve respiration.
- The indications for chest physiotherapy include patients with excessive thick secretions in the bronchi, bronchioles and lungs due to bronchitis, bronchiectasis, lung abscess, lobar pneumonia, bronchial asthma and chronic smoking.
- Method: Chest physiotherapy is a combination of *chest percussion* and *vibration* and *postural drainage* (therapeutic positioning of the patient to ensure drainage of retained secretions from specific segments of the lungs by gravity). Both chest percussion/vibration and postural drainage should be done at least 2 hours after a meal to reduce the risk of vomiting or aspiration. All tight clothing around the neck, chest and waist must be loosened before starting the procedure (percussion, vibration or postural drainage).

During chest percussion, the patient is made to lie down and a light towel is placed on the area of the patient's chest to be percussed. Then with your cupped hands, "clap" rhythmically and rapidly over the affected areas of the chest wall for 3 to 5 minutes on each area (percuss with alternate hands and listen to the sound produced). When done correctly a hollow, deep sound is produced. Percussion should **not be** done over bony prominences as this may cause discomfort.

Vibration is done by putting the ball of one palm over the other on the chest wall and quickly contracting and relaxing your arms (in a kneading motion) to cause vibration of the chest as the patient exhales.

A vibrating machine set at midrange may be used if available. Vibration is done for 5 to 10 minutes while encouraging the patient to cough. Chest percussion loosens the chest secretions while vibration moves it

from the affected area of the lung. The most affected area of the lung should be drained first.

Postural drainage is the gravitational clearance of airway secretions by assuming one or more different body positions for 5 to 10 minutes each time. It is achieved by positioning the patient so that lung segments with secretions drain by gravity. Positions used are:

- *prone* (face down) with the head lowered 30° downward angle (Trendelenburg's position) and a small pillow placed under the hip to drain the posterior base of the lungs),
- *recumbent* (on the back) with the head of the bed lowered and the foot of bed elevated 45 to 50 cm. and a small pillow placed under the knees. This drains the middle lobes of the lungs.
- *Sitting up reclining* (semi-Fowler's position) and *sitting up leaning forward* on pillow or table to drain the upper lobes. In these positions percussion is done on the shoulders and vibration is done by rocking the upper torso forward and backward and from side to side.
- *Lying on the left and right sides respectively* with foot of bed elevated 45 to 50 cm. to drain the middle lobes of the lungs.

During postural drainage the patient is given a sputum mug and as the secretion drains, he is instructed to expectorate the secretions, to cough and breathe deeply. The intervention is stopped when no more secretions are drained or if the cough is no longer productive or the patient can no longer tolerate the procedure.

- **Contraindications:** chest physiotherapy is not done if the patient has cyanosis (bluish discoloration of the skin and mucous membranes due to excessive concentration of reduced haemoglobin in the blood), pain during treatment, unstable vital signs and dyspnoea (difficulty breathing).

#### **4. Oxygen Therapy**

Oxygen therapy is the administration of supplemental oxygen to a patient to prevent or treat hypoxemia (reduced arterial blood oxygen) and hypoxia (insufficient oxygen in the tissues to meet metabolic demands) and increased work of breathing with use of accessory muscles during respiration. In your course on foundations of nursing and nursing procedures you must have been told about the complications of oxygen therapy e.g. suppression of ventilation (oxygen-induced hypoventilation), atelectasis (collapse of the lungs), oxygen toxicity, damage to the eyes either in the form of retinal injury or retrolental fibroplasias (scarring behind the lens of the eyes due to exposure to high oxygen tension). You also would have learned about what to do to

prevent these complications. Note that oxygen should be given with care in patients with chronic lung disease.

The amount of oxygen delivered is expressed as percentage concentration e.g. 40% and Oxygen delivery systems may be:

- *Low-flow* - the patient breathes in both oxygen from the apparatus and the atmospheric air so the system delivers oxygen concentration that is variable (not constant or known). Devices that make up low-flow systems are nasal cannula (delivers 23-40% oxygen at 1-5 litres / minute), oropharyngeal catheter (23-42% at 1-6 L/min.) and simple face masks (40-60% at 6-8 L/min.)
- *High-flow* - the patient breathes in only the gas supplied by the apparatus and so the system delivers a consistent and accurate oxygen concentration to meet the needs of the patient. Examples of high-flow devices are Venturi mask (delivers 24-40% at 4-8 L/min.), tracheal catheter (60-100% at 1-4 L/min.), face tent (30-100% at 8-10 L/min.). The system used depends on the needs of the patient.

**Read up your notes on nursing procedures for the principles to observe during oxygen therapy and what your duties and responsibilities are, concerning a patient receiving oxygen.**

## **5. Insertion of Artificial Airways (Endotracheal Tubes and Tracheostomy)**

Artificial airways are used to maintain a patent airway in patients who are unconscious or cannot breathe properly. Types of artificial airways include:

- Oral airways (inserted through the mouth into the oropharynx) to prevent the tongue from falling back in the unconscious patient and to facilitate suctioning
- Nasal airways (inserted through the nose to the nasopharynx) for patients who cannot tolerate oral airway. The tubing is longer and narrower than that used as oral airways.

The above 2 artificial airways may be inserted by the nurse but the doctor inserts the next 2. The nurse however assists by setting the tray for insertion and holding the patient.

- Endotracheal tube (inserted into the trachea through the mouth or the nose) to relieve airway obstruction, facilitate suctioning and artificial ventilation and prevent aspiration

- Tracheostomy tube to ensure long term artificial airway and relieve airway obstruction

**Refer to your course material on clinical procedures and read up the care given to the patient with endotracheal and tracheostomy tubes.**

## **SELF ASSESSMENT EXERCISES 2**

1. Discuss the safety guidelines you should follow when administering oxygen to a patient.
2. Identify signs and symptoms that indicate the need to perform postural drainage.
3. Look up the negative pressure settings required for respiratory suctioning in different age groups.

## **4.0 CONCLUSION**

Having completed the course material on this unit, you are expected to have understood the physical assessments and diagnostic tests and procedures carried out for respiratory disorders. You should also be able to differentiate between normal and abnormal assessment values and describe the common interventions done to relieve symptoms in patients with respiratory problems.

## **5.0 SUMMARY**

This unit has discussed the physical assessments and diagnostic procedures carried out for respiratory disorders and also the common interventions carried out to relieve symptoms and enhance functioning in patients with respiratory problems.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. Discuss the nurse's responsibilities before, during and after the following diagnostic tests and interventions:
  - a) Chest physiotherapy
  - b) Collection of specimen for throat swabs and sputum
  - c) Lung biopsy
2. What principles must be observed for a patient receiving oxygen therapy?
3. Discuss the safety guidelines you should follow when administering oxygen to a patient.

## 7.0 REFERENCES/FURTHER READINGS

- Black, J. M. & Matassarini-Jacobs, E. Luckmann & Sorenson (2000) *Medical-Surgical Nursing: A Psychophysiologic Approach*, W.B.Saunders Co., Philadelphia (Chapters 36 and 37).
- Smeltzer, S. C. & Bare, B. G. Brunner & Suddarth (2004) *Textbook of Medical-Surgical Nursing*, Lippincott Williams & Wilkins, Philadelphia (chapters 21 and 25).
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## **UNIT 3      CONDITIONS                      AFFECTING                      THE GASTROINTESTINAL (DIGESTIVE) SYSTEM**

In this unit, the following will be discussed: **medical and surgical conditions of the mouth, oesophagus, stomach and intestines.**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Review of the Structure and Functions of the Gastrointestinal Tract
  - 3.2 Assessment of Patients with Gastrointestinal Disorders
  - 3.3 Medico-Surgical Disorders of the Mouth and Oesophagus
  - 3.4 Medico-Surgical Disorders of the Stomach and Intestines
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In the last 2 units you learned about the respiratory system, how it controls the intake, utilization and elimination of gases; the assessments and tests done for diagnosis of respiratory conditions and the common interventions carried out to relieve respiratory symptoms. In this unit, you will learn about the gastrointestinal tract, which is the system responsible for the intake, processing, utilization and elimination of fluids and nutrients. A functional gastrointestinal system is necessary for health because it provides the body with the needed nutrients, fluids and electrolytes for effective body functioning and also excretes wastes from digestion and utilization of nutrients. Any disorder affecting the tract inevitably interferes with the major functions of the tract (ingestion, digestion and absorption of nutrients, fluids and electrolytes; and the elimination of the waste products of these processes). This interference will eventually affect body functioning.

### **2.0 OBJECTIVES**

- after going through this unit, you Describe the structure and functions of the gastrointestinal system
- describe the pathophysiology of the medical and surgical conditions affecting the gastrointestinal system in relation to their effects on digestion, absorption and utilization of foods

- identify clients suffering from medical-surgical conditions of the mouth, oesophagus, stomach and intestines
- discuss the medical and surgical management of conditions affecting the mouth, stomach and intestines using the nursing process approach should be able to:

### 3.0 MAIN CONTENT

#### 3.1 Review of the Structure and Functions of the Gastrointestinal Tract

In the courses on Anatomy and Physiology, you studied about the gastrointestinal or digestive system. You will recall from those courses that the gastrointestinal (digestive) tract is a 23 to 26-foot-long hollow muscular tube extending from the mouth to the anus, with one major distended area (the stomach). It comprises the mouth, oesophagus, stomach, small intestine and large intestine. ***You need to read up the structure and functions of each organ of the tract.*** The tract is adequately supplied with blood and nerve supplies which ensure its functioning. The major functions of the tract include:

1. Ingestion of foods and fluids through the mouth
2. Movement of the ingested foods and fluids through the tract by peristaltic contraction.
3. Digestion of ingested foods and fluids by enzymes and hormones secreted by the tract
4. Absorption of end products of digestion into the blood stream
5. Elimination of undigested and unabsorbed foods and waste products from the body through the anus

To achieve these functions, the tract depends on 2 types of secretions – mucus secretions and digestive secretions containing enzymes and electrolytes.

#### SELF ASSESSMENT EXERCISE 1

1. List the major secretions/enzymes of the gastrointestinal tract; listing their sources, digestive actions and food nutrients they act on.
2. Several substances regulate the activities of the digestive tract. Discuss the substances that work as ***neuroregulators, hormonal regulators and local regulators.***
3. Discuss the process of absorption of carbohydrates.

### 3.2 Assessment of Patients with Gastrointestinal Disorders

Recall from the previous section that the gastrointestinal tract is responsible for the provision of nutrients, fluids and electrolytes to the body and the elimination of waste products of digestion from the body. When the tract is diseased the normal functions of the tract are interfered with and this can be elicited by certain assessments and tests. Assessments on the gastrointestinal tract take the form of general assessments and include history, physical examination and diagnostic tests.

**1. Health history:** When collecting the health history from a patient with digestive disorders, there is need to find out the following:

- a. A family history of digestive disorders e.g. peptic ulcer ulcerative colitis, Crohn's disease etc.
- b. The diet history of the patient including food practices, relationship of symptoms with food intake etc.
- c. Any symptoms of gastrointestinal dysfunction e.g. indigestion, intestinal gas, nausea, vomiting, diarrhoea, constipation, changes in bowel habits and stool characteristics etc.
- d. Any use of alcohol

**2. Physical examination:** This includes:

a) *Inspection* of the

- Mouth, tongue, gums, teeth, for ulceration/excoriation, growths, swelling, discoloration
- Abdomen for swelling, discoloration, scars, contour, symmetry for localised bulging and distension
- Anal area for ulceration/excoriation, growths, anal fissures, external haemorrhoids etc.
- Inspection of vomitus and stools for consistency, contents etc. This will assist in diagnosis of certain gastrointestinal conditions like gastro-enteritis, typhoid, cholera and other inflammatory diseases of the tract.

b) *Auscultation* of the abdomen for bowel sounds for presence, characteristics, location and frequency

c) *Percussion* of the abdomen for size and location of abdominal organs and to detect dullness, masses, fluid and air. The characteristic of abdominal sound on percussion often alerts the doctor and nurse of abnormalities in the internal organs that require further investigations.

- d) *Palpation* of the neck and abdomen identifies areas of swelling, tenderness, pain from oesophagitis, hiatus hernia, appendicitis etc.

### 3. Diagnostic Tests

The diagnostic tests for digestive abnormalities include:

- a) Endoscopy (oesophagoscopy, gastroscopy, colonoscopy, proctosigmoidoscopy)
- b) Gastrointestinal (GI) series e.g. Barium swallow, meal or enema – these help to confirm the diagnosis of peptic ulcer and cancers of the digestive tract
- c) Gastric analysis, that is, analysis of gastric juice to obtain information about the secretory activity of the stomach and gastric acid stimulation test. These assist in diagnosis of peptic ulcer, gastrointestinal reflux disease (GERD) etc.
- d) Stool examination for colour, consistency, presence of blood, undigested foods, etc. stool consistency indicate abnormalities in the tract e.g. the presence of undigested food indicates malabsorption syndrome and the presence of blood reflects bleeding in the tract. If there is frank blood, it means the bleeding is in the lower part of the tract while occult or denatured blood indicate bleeding in the stomach and upper part of small intestine.
- e) Abdominal ultrasonography
- f) Laparoscopy
- g) Computed tomography (CT) scans and Magnetic Resonance Imaging (MRI)
- h) Exfoliative cytology and biopsy of tissues of the tract confirm diagnosis of benign or malignant tumour in the tract.

### 3.3 Medico-Surgical Disorders of the Mouth and Oesophagus

#### 1. CLEFT LIP/ CLEFT PALATE

**Definition:** This is a congenital craniofacial malformation or defect manifesting as a fissure or longitudinal opening/split of varying degrees on the lip (cleft lip or harelip) or of the roof of the mouth (cleft palate). It results from incomplete fusion of the embryonic structure surrounding the primitive oral cavity.

**Incidence:** Cleft lip with or without cleft palate is estimated to occur in 1 in 800 live births while cleft palate occurs approximately in 1 in 2,000 live births. Cleft lip is predominant in male children while cleft palate occurs more in female children. Cleft lip may be unilateral or bilateral

affecting the external nose, nasal cartilage or nasal septum while cleft palate may affect the soft palate and/or hard palate and occurs in the midline of the posterior palate.

**Causes:** Cleft lip/palate results from failure of the two sides of the face to unite properly during the early stage of embryonic development. Suggested contributory factors include poor maternal health, serious maternal infection and effect of certain drugs during early pregnancy and chromosomal syndrome in the foetus. Cleft lip has a strong inheritance link.

## **NURSING PROCESS RELATED TO CLEFT LIP AND CLEFT PALATE**

### **Assessment**

*On inspection* the cleft is readily visible at birth. The infant is found to be unable to suckle or drink because the baby is unable to generate negative pressure and create suction in the oral cavity. In cleft palate the baby may be unable to swallow properly if the defect extends to the hard palate at the back of the mouth. For cleft palate food swallowed goes through the roof of the mouth into the nostrils. The area of the palate is therefore susceptible to inflammation.

An important initial assessment is to determine

- Whether the defect is isolated or a feature of a broader syndrome
- The degree of abnormality.
- Assess and describe the location and extent of the defect and the emotional impact of the defect on the parents.

The older child is found to have dental anomalies e.g. deformed or malpositioned teeth and impaired verbal communication because the defect prevents effective movement of the soft palate. In this case, consonants such as *g*, *b*, *d* and *f*, which are normally formed by pressure against the roof of the mouth, are distorted by the fissure in the palate extending to the nasal cavity.

### **Nursing Diagnosis**

1. Imbalanced nutrition: less than body requirement, related to inability to suck properly because of physical defect. (Imbalanced nutrition may also be related to ineffective breastfeeding).
2. Impaired oral mucous membrane related to fissure in the mouth
3. Ineffective airway clearance related to a common passage for breathing and feeding (in cleft palate)

4. Impaired verbal communication related to inadequate palate function (this diagnosis applies to older children)
5. Risk for aspiration of feeds related to common passage for breathing and feeding (in cleft palate)
6. Risk for impaired body image related to disfigurement / speech defect
7. Parental grieving related to birth of child with congenital defect
8. High risk for altered parenting related to infant with visible physical defect.

### **Planning and Implementation of Care**

Objectives of management include:

- To improve the ability to feed
- To provide adequate nutrition and prevent malnutrition
- To enhance verbal communication at appropriate age
- To prevent and treat short-term problems (aspiration and feeding) and long-term problems (feeding, speech and social rejection).

**Surgical Management:** The deformity is usually corrected by a surgical operation in which the tissues of the mouth are loosened and then stitched together. The reconstructive surgery for cleft lip may be done in the first few weeks of life (for minor cleft) if there is no respiratory, oral or systemic infection or when the child reaches a weight of 6 to 7 kg at about the age of 3 months (in more extensive cleft). Surgery for cleft palate is usually done when the child is 12 to 18 months old but before the child develops faulty speech. The surgical procedure for cleft lip repair is cheiloplasty (closure of the lip defect) using staggered suture lines (Z-plasty) to minimize notching of the lip from retraction after surgery. For cleft palate the surgery is usually done in stages and the surgeon may close the soft flap area and allow it to heal before doing a palate bone grafting (palatoplasty). When the wound heals, intensive speech therapy is necessary and beneficial to the child.

### **Nursing Management**

1. Because the opening between the mouth and the palate prevents suction and proper feeding, the nurse must feed the baby carefully using spoon or special feeding appliances e.g. dropper or lamb's nipple or syringe with rubber tubing or an obturator (a device inserted into the mouth to close the cleft while the baby is sucking). The nurse must also teach the mother to position and stabilize the nipple well back in the baby's oral cavity during breastfeeding so that the tongue action may facilitate milk expression and enable the baby to feed properly. Appropriate positioning also prevents choking

and the risk of aspiration. While feeding, the baby should be placed in an upright position, not slanting, to prevent choking. The baby should be made to burp frequently because of the tendency to swallow excessive amounts of air during feeding.

2. Monitor baby's weight to assess adequacy of nutritional intake.
3. As a nurse you should also prevent respiratory infection by preventing aspiration of feeds.
4. Mouth care is given frequently to keep the mouth clean and reduce the risk of infection.
5. Most surgeons use absorbable catgut for stitching the cleft repair and this does not require removal of sutures.
6. Provide emotional support to the parents and other relatives as a disfiguring visible defect is particularly disturbing to parents and may generate a strong negative response towards the baby and affect parent-infant attachment/bonding. Therefore encourage the parents to verbalize their concerns, grief and fears and try to allay them by acknowledging their concerns, emphasizing the positive aspects of the infant's physical appearance and expressing optimism regarding surgical correction. It may be beneficial to arrange meeting with other parents who have experienced a similar situation and coped successfully.
7. Pre-operative care: It is important to acquaint the parents with the expectations after surgery. These include the fact that the baby will not be allowed to be in the prone position, therefore it is necessary to accustom the baby to lying on the back or side. No special preparation is required in terms of feeding restrictions. The child is allowed to eat up to 4 hours before the surgery.
8. Post-operative care:
  - Try as much as possible to prevent the baby from crying as crying places a strain on the suture line and impairs proper healing. Sometimes a Logan bow is placed on the lip to protect the suture line.
  - After surgery elbow restraint should be used to prevent the baby from rubbing the surgical area.
  - Inspect the operative site for any bleeding, infection, sloughing and irritation.
  - Observe for any behavioural and physiologic indicators of pain and respond appropriately.
  - The baby is usually fed with a special syringe with a rubber tip for cleft lip repair or through cup in cleft palate repair. Most surgeons do not allow small spoon to be used after cleft palatoplasty.
  - The older child should be given pureed or soft diet and avoid hard food items.

- Avoid the insertion of objects in the mouth e.g. thermometer, spoon or straw.
- Pain relief is achieved with opiates for the first 24-4 hours and thereafter with Acetaminophen.
- Prophylactic Antibiotics are given from pre-operative period to prevent infection.
- Teach parents how to cleanse the suture line after discharge

## 2. STOMATITIS AND OTHER MOUTH INFECTIONS

**Definition:** Stomatitis is the inflammation of the mucosa of the mouth cavity. It may originate on its own and be infectious (primary) or develop as a symptom of a systemic disease (secondary) e.g. allergies, nutritional disorders, or immunodeficiency. The sores may extend to the lips, tongue and inside of the cheeks. Therefore both gingivitis (inflammation of the gum) and glossitis (inflammation of the tongue) are forms of stomatitis.

**Causes include:**

- a) mild irritation of the mouth mucosa from chemicals like strong alcohol and mouth wash, nicotine smoke, harsh alcohol and spicy foods
- b) severe irritation of the mouth resulting from poisons like lead or mercury
- c) prolonged poor oral hygiene
- d) vitamin deficiency, especially Vitamin B
- e) immunosuppressant therapy
- f) mechanical trauma from jagged teeth, badly fitting dentures, cheek biting, injury from fish bone etc
- g) underlying diseases e.g. AIDS- related opportunistic infections, diabetes mellitus
- h) bacteria like streptococci, viruses like the herpes simplex virus, spirochetes (causes Vincent's angina) and candida albicans (thrush)
- i) Sometimes the cause is unknown e.g. in aphthous stomatitis which is also sometimes associated with stress, anxiety, febrile states and overexposure to the sun.

**Pathophysiology:** Irritation of the oral mucosa causes excoriation resulting in mouth pain, excessive salivation, bad breath, anorexia and swelling and extreme tenderness of the mucosa. Depending on the cause, the mucosa may bleed or is covered with greyish-white membrane (in Vincent's angina). The patient also has systemic symptoms like malaise and fever. The inflammation may spread to the tongue and throat causing painful tongue, sore throat, pain on swallowing and lymphadenopathy.

Recall from the functions of the digestive tract that the mouth is involved in chewing and movement of food into the oesophagus; and the digestion of cooked starch begins in the mouth. Anything that interferes with these processes affects the digestion of food.

## **NURSING PROCESS RELATED TO THE PATIENT WITH STOMATITIS**

### **Assessment**

- 1. Health History:** the patient usually reports of mouth soreness and pain with or without bleeding gums.
- 2. Signs and Symptoms:** a sudden onset of mouth soreness, ulceration and pain; fever, anorexia, bad breath, increased salivation, malaise, painful chewing and swallowing and sometimes bleeding gums.
- 3. Physical Examination:**
  - *On inspection* the gums appear swollen and ulcers may be evident on the tongue and oral mucosa. Depending on the cause the ulcers may be reddened or covered with whitish or greyish-white membrane.
  - *On palpation of the neck* the lymph glands are found to be swollen and tender.
- 4. Diagnostic Tests:** although the diagnosis of stomatitis depends on physical examination, diagnostic tests may help to identify the type of infection. These tests include smear of the ulcer exudates and herpes vesicles for culture and sensitivity.

### **Nursing Diagnosis:**

1. Acute pain in the mouth related to mouth inflammation and ulceration
2. Imbalanced nutrition, less than body requirements, related to inability to ingest food secondary to soreness and pain in the mouth.
3. Impaired oral mucous membrane related to ulceration

### **Planning and Implementation of Care:**

#### **Nursing Management**

1. Encourage the patient to rest especially in acute herpetic stomatitis. Locally resting the mouth by not chewing hard foods should also be encouraged.

2. Show patient how to clean his teeth with soft tooth brush or sponge. Encourage to clean the mouth frequently and thoroughly to prevent halitosis. Rinsing with *non-antiseptic/ alkaline* mouthwash e.g. diluted hydrogen peroxide or saline, soothes sore oral mucosa and prevents superimposed infection.
3. Since patient has painful mouth with difficulty chewing and swallowing, encourage to take soft or liquid or pureed diet rich in calorie, protein and vitamins. Encourage to take cool drinks which also soothe the sore mouth mucosa.
4. Administer prescribed antibiotics and analgesics. A topical soothing agent e.g. topical anaesthetic solution may be applied to the mucosa to reduce soreness and pain and reduce inflammation. Such anaesthetic agents include “bonjela” cream
5. Monitor vital signs to rule out superimposed infection.
6. Patient teaching:
  - Avoid stress and fatigue
  - Avoid the offending substance e.g. smoking, strong tooth paste, alcohol, etc.
  - Avoid use of antiseptic mouthwash as these irritate the mouth ulcers
  - Avoid hot spicy foods
  - Take nourishing foods
  - Good oral hygiene

### **Medical Management**

Medical management is mainly symptomatic and depends on the cause of the stomatitis.

1. Removal of the irritating factor and treatment of the underlying cause e.g. high potency vitamin for hypovitaminosis, immune boosters for immunosuppression, removal of jagged tooth or ill-fitting denture etc.
2. Analgesics for pain; these may be topical or systemic
3. Antibiotics to which the causative micro-organism is sensitive. For herpetic stomatitis, antiviral drugs e.g. Acyclovir are administered. For oral candidiasis antifungal agents e.g. Fulcin 1 gm t.d.s. or nystatin is prescribed.
4. Topical corticosteroids may be prescribed to reduce the inflammatory reaction.
5. In Vincent’s angina the doctor may need to remove the devitalized tissue with ultrasonic scaler

### **Evaluation**

With treatment the pain subsides in 3 to 4 days while the ulcers usually heal within 8 to 10 days unless complicated by superimposed infection.

### 3. GASTROESOPHAGEAL REFLUX DISEASE (GERD)

**Definition:** A group of conditions resulting from gastroesophageal reflux whereby the gastric contents flow back into the oesophagus without associated belching or vomiting. Over time the reflux causes erosions of the oesophagus.

#### Causes

1. Incompetent lower oesophageal sphincter (LES) e.g. due to Hiatus hernia
2. Anything that lowers the LES pressure e.g. over-full stomach (especially in the night when the individual has to lie down); intake of alcohol, cigarette smoking, certain foods e.g. fat, orange juice and chocolate and the use of certain drugs e.g. atropine, propantheline, morphine etc.
3. Pyloric stenosis
4. Aging reduces the competence of the LES because of loss of elasticity of muscles in old age
5. Certain care procedures e.g. nasogastric intubation lasting more than 4 days, reduce the competence of the LES
6. Certain positions e.g. lying on the back or lying on the side, especially soon after eating
7. Motility disorder whereby the gastric contents remain for longer than necessary in the stomach and have the chance of flowing back into the oesophagus

**Pathophysiology:** Recall from your anatomy and physiology course that the stomach is responsible for liquefying and mixing food into chyme and regulating the flow of food into the small intestines. The food does not flow backwards into the oesophagus because of the presence of the lower oesophageal sphincter (LES). In normal circumstances, the lower oesophageal sphincter prevents the reflux of gastric contents upwards into the oesophagus. The rate at which the stomach empties its content downwards depends on the volume of food ingested and the nature of the ingested food. If the food in the stomach is too bulky or of the wrong type e.g. fatty, it does not move downwards as fast as expected and therefore the pressure it creates on the LES makes the food to move backwards towards the oesophagus especially when the individual is lying down.

However in some situations, some degree of back-flow of gastric contents into the oesophagus occurs normally in both adults and

children. These situations include lying down flat on the back when the stomach is full in which case the pressure within the stomach exceeds the lower oesophageal sphincter pressure. Therefore, when excessive reflux occurs it causes problems. The gastric contents irritate and cause inflammation of the oesophageal mucosa causing redness, oedema and hypersecretion of mucus by the oesophageal cells, heartburn, hypersalivation and pain in the throat.

## **NURSING PROCESS RELATED TO THE PATIENT WITH GERD**

### **Assessment**

1. **Health History:** The patient usually reports heartburn, irritation and pain in the throat, hypersalivation that wakes him up at night coughing or choking. During history it is important to find out patient's food preferences that may have predisposed him to gastric reflux.
2. **Clinical Manifestations:** The symptoms of GERD include frequent and persistent burning sensation in the throat, dyspepsia (heartburn/indigestion), pain on swallowing (odynophagia, that is dysphagia with pain on swallowing), nocturnal hypersalivation, chronic pain in the throat caused by spasms or a dull substernal ache which indicates long term reflux dysphagia.
3. **Physical Examination:** *Inspection* of the throat through endoscopy (oesophagoscopy) reveals area of inflammation and other pathologic changes in the lower oesophagus.
4. **Diagnostic Tests:** Apart from history and physical examination, tests carried out to confirm diagnosis of GERD include:
  - Barium swallow with fluoroscopy to evaluate the degree of damage to the oesophagus
  - 12 to 36 hours oesophageal pH monitoring to evaluate the degree of acid reflux. This is also called oesophageal acidity test and is the standard and most sensitive and accurate measure of oesophageal reflux.
  - Oesophageal manometry to evaluate the resting pressure of the LES and determine sphincter competence

### **Nursing Diagnosis**

1. High risk for aspiration related to backflow of stomach contents during sleep
2. Pain in the throat related to irritation and inflammation of the oesophagus

3. Imbalanced nutrition; less than body requirements related to dyspepsia and feeling of fullness in the stomach

### Planning and Implementation

Objectives:

- To reduce reflux through gravity which reduces intra-abdominal pressure
- To strengthen the LES
- To neutralize the gastric content

The main lines of treatment include *positional therapy, diet therapy, drug therapy and surgery* if drug therapy fails.

### Nursing Management

1. Encourage patient to assume positions that reduce the intra-abdominal pressure e.g. head elevated by 6 to 12 inches (at 45°), especially when sleeping.
2. Encourage to eat foods that reduce acid reflux and avoid those that increase reflux. Diet should be bland during the acute stage and contain lots of non-fat milk. Milk reduces acidity of gastric contents and reduces irritation of the oesophagus. Diet should be low-fat and patient should avoid caffeine, whole milk, tobacco, beer, carbonated beverages and foods that are acidic e.g. tomato, citrus etc.
3. Give emotional and psychological support to help patient cope with pain and discomfort
4. Give prescribed analgesics to reduce pain caused by oesophageal irritation
5. Monitor the patient's response to therapy
6. If surgery is done, you should provide appropriate pre-operative and post-operative care including adequate positioning, monitoring of vital signs, care of chest tube drainage etc.
7. Patient teaching include:
  - Counsel patient to *avoid*:
    - Lying down immediately after meals especially night meals
    - Foods that increase reflux e.g. highly seasoned foods, foods high in fat, acidic juices like orange juice, tomato, caffeine, chocolates etc. especially late at night
    - Eating or drinking 2 hours before bedtime

- Tight-fitting clothes especially around the chest and waist
  - Positions that increase intra-abdominal pressure e.g. bending
  - Constipation
  - Alcohol and cigarette smoking
- Advice patient on the correct positions to assume that will reduce intra-abdominal pressure e.g. elevating the head of the bed about 6 to 12 inches (at 45°)
  - To maintain optimum weight and avoid excessive weight gain
  - To eat smaller meals

### **Medical Management**

1. Antacids given 1 to 2 hours after meals
2. Histamine receptor blockers e.g. cimetidine (Tagamet) 20 mg *bid* or ranitidine (Zantac) to reduce gastric acidity
3. Cholinergic drugs e.g. bethanechol to increase LES pressure
4. Medications that decrease the release of gastric acids and help heal the oesophageal erosions e.g. lansoprazole (Prevacid) solutab 30 mg *bid* or pantoprazole sodium (Protonix) sustained release tablets 40 mg daily.
5. Surgery is done if refractory symptoms or serious complications like bleeding, intractable pain and perforation result or the cause of the GERD requires surgery e.g. hiatus hernia. Surgical procedures reduce reflux by wrapping a portion of the fundus of the stomach around the sphincter area of the oesophagus thus creating artificial closure at the oesophageal junction. Other surgical procedures include vagotomy or pyloroplasty.

### **Evaluation**

Effective treatment of GERD ensures the control of reflux and the healing of any erosion in the oesophagus. However, long-term untreated GERD has been implicated in laryngitis due to prolonged erosion of laryngeal tissue by gastric acid.

## **3.4 MEDICO-SURGICAL DISORDERS OF THE STOMACH AND INTESTINES**

### **1. GASTRITIS**

**Definition:** Gastritis is the inflammation of the lining of the stomach. It is a common GI disorder and may be acute or chronic. Acute gastritis is

short-term severe inflammation of the stomach mucosa with reddening, oedema and erosion while chronic gastritis occurs repeatedly over a period of time. Gastritis may affect any part of the stomach or be confined to the fundus and body portions.

### **Causes**

*Acute gastritis* is caused by

- Chronic ingestion of irritating substances e.g. hot peppers, alcohol, caffeine
- Dietary indiscretions
- The incidence of gastritis is highest among heavy drinkers and smokers
- Chronic use of certain drugs e.g. aspirin, nonsteroidal anti-inflammatory drugs, cytotoxic drugs etc.
- Ingested poisons and corrosive agents especially mercury, carbon tetrachloride etc.
- Food poisoning caused by endotoxins released from infecting bacteria like staphylococci, Escherichia coli
- Major trauma e.g. severe burns
- Gastritis may occur secondary to diseases like liver cirrhosis, renal disease

*Chronic gastritis* is caused by

- Repeated bouts of acute gastritis
- Vitamin deficiencies
- Excessive and prolonged use of alcohol
- Recurring exposure to irritating substances such as drugs, smoking etc.
- Infection with Helicobacter pylori
- Chronic reflux of pancreatic secretions and bile into the stomach
- A combination of any of the above factors
- Peptic ulcer disease, Pernicious anaemia and Renal disease
- Old age -It is more common in older people

### **Pathophysiology**

In normal circumstances the mucous lining of the stomach protects it from the action of the gastric acid because of the mucus secretion and the presence of a hormone called prostaglandins. In gastritis this mechanical barrier is deficient and the action of hydrochloric acid makes the mucous membrane of the stomach to become inflamed, hyperaemic

(congested with fluid and blood) and eroded on the surface. The oedematous gastric mucosa secretes lots of mucus but little gastric juices and little acid. This lack of gastric juices interferes with digestion.

Inflammation of the gastric mucosa may result in the formation of ulcers and as the ulcers deepen they bleed into the stomach resulting in haematemesis (vomiting of blood). Sometimes gastritis may result in hyperchlorhydria (high levels of hydrochloric acid) and this excess acid further irritates the gastric mucosa. The damage in acute gastritis is short-term, heals within a few days and is limited to certain parts of the stomach.

In chronic gastritis especially the one associated with pernicious anaemia, gastric ulcer and cancer, the mucosa may become atrophied (thinned) or even hypertrophied (thickened) and this affects all layers of the stomach lining frequently causing haemorrhage. Continued atrophy of the gastric mucosa in chronic gastritis leads to loss of the parietal cells (which secrete intrinsic factor) and this results in vitaminB<sub>12</sub> deficiency and subsequent development of pernicious anaemia. The mucosal changes also diminish the amount of gastric acid secretion which eventually consists only of mucus and water. This is called achlorhydria (absence of hydrochloric acid) or hypochlorhydria (low level of hydrochloric acid). The hypertrophy of the mucosa and ruggae of the stomach may lead to the development of gastric cancer. *Therefore though chronic gastric ulcer may develop because of pernicious anaemia and gastric cancer, these conditions may also develop as complications of chronic mucosal changes in chronic gastritis.*

## **NURSING PROCESS RELATED TO THE PATIENT WITH GASTRITIS**

### **Assessment**

- 1. Health History:** The patient's health history may reveal one or more causative agents. After exposure to the causative agents the patient complains of rapid onset of epigastric discomfort or frank cramping pain with indigestion, intolerance to spicy or fatty foods, nausea and vomiting and sometimes vomiting of blood.
- 2. Clinical Manifestations:** symptoms of acute gastritis include epigastric pain, abdominal tenderness and fullness, eructation (belching, that is oral ejection of gas from the stomach), heart burn after eating, a sour taste in the mouth, nausea and vomiting, anorexia, hiccups and sometimes haematemesis.

In chronic gastritis, the symptoms may be vague, though the patient sometimes complains of anorexia, feeling of fullness in the stomach, epigastric pain and sometimes nausea and vomiting.

### 3. Physical Examination

- *Inspection* of the stomach lining using a gastroscope (gastroscopy) reveals areas of erosion or ulceration and bleeding from the stomach mucosa. This test should not be done if the cause of the gastritis is ingestion of a corrosive agent.
- *Palpation* of the abdomen may disclose abdominal distension, tenderness and guarding.
- *Auscultation* may reveal increased bowel sounds

4. **Diagnostic Tests:** include upper GI radiographic studies e.g. barium meal, histological examination of the gastric tissue specimen obtained through biopsy

### Nursing Diagnosis

1. Acute pain related to inflammation and irritation of the stomach mucosa. In chronic gastritis the pain is chronic.
2. Imbalanced nutrition: less than body requirements, related to anorexia
3. Fluid volume deficit (actual) related to vomiting. There may however be risk for fluid volume deficit related to nausea.
4. Anxiety related to gastric pain. If there is haematemesis the anxiety may be related to it.

### Planning and implementation

Objectives:

- To relieve abdominal pain
- To reduce the irritation of the gastric mucosa

## **Nursing Management**

Nursing interventions include promoting comfort, reducing anxiety, promoting optimal nutrition and hydration, relieving pain and ensuring adequate patient education.

1. Most patients with acute gastritis do not require treatment so advise the patient to rest the stomach by taking nothing by mouth until acute symptoms subside.
2. After acute symptoms have subsided and patient can tolerate oral foods, give patient bland diet and advise to avoid foods that irritate the stomach mucosa. Offer small meals at frequent intervals to reduce the amount of irritating gastric secretions.
3. Assess the risk factors and advise patient to avoid them
4. Administer antacids and other prescribed medications
5. Monitor fluid intake and output especially if the patient is vomiting; if the patient is bleeding as evidenced by vomiting of blood, the blood volume and haematocrit are also monitored.
6. Provide emotional support to the patient and family.
7. If the patient is to undergo surgery, prepare him/her pre-operatively and also give appropriate post-operative care.
8. Patient education:
  - a) Counsel patient to avoid emotional stress irritating substances e.g. spicy and fatty foods, caffeine, alcohol, smoking
  - b) Teach the importance of appropriate diet and give him a list of foods to avoid
  - c) Help patient to identify the need for stress reduction
  - d) Stress the importance of taking certain medications e.g. aspirin, steroids etc with food, milk or antacids in order to reduce gastric irritation.

## **Medical Management**

Treatment for acute gastritis is symptomatic and supportive. The immediate treatment priority is to eliminate and/or treat the cause of the gastric irritation and inflammation. In mild cases avoiding the offending irritant leads to healing of the inflammation, but in severe cases treatment involves:

1. Antacids e.g. aluminium hydroxide, magnesium trisilicate etc. to buffer (neutralize) the effect of the acidic gastric juices on the gastric lining. This may be administered 2 hourly in acutely ill patients to reduce the frequency of episodes of acute pain.

2. Anti-emetics may be prescribed for vomiting and nausea. This is given 1 hour before meals. If the vomiting is severe and the patient is dehydrated, IV fluids are administered.
3. Histamine antagonists may be ordered e.g. cimetidine (Tagamet), ranitidine (Zantac) etc.
4. Gastric acid inhibitors e.g. lansoprazole (Prevacid) to decrease gastric acid secretion and reduce irritation of the inflamed stomach lining
5. Antibiotics are given if the cause is bacterial infection
6. Blood is transfused if the patient is bleeding in the stomach. Vasopressin in sodium chloride solution may be infused into the stomach to stop the bleeding.
7. Surgery may be indicated for client with severe bleeding from erosive gastritis. Surgical procedures include pyloroplasty or vagotomy.

## **Evaluation**

Appropriate treatment of gastritis ensures the healing of the inflamed mucosa. But if the episodes of gastritis become frequent or the mucosa become hypertrophied or atrophied or the inflammation heals with scar tissue, certain complications may occur. These include pernicious anaemia, gastric cancer and gastric ulcer.

## **2. PEPTIC ULCER**

The last topic you considered was gastritis which is similar in clinical manifestations and management to gastritis except that the ulceration in the mucosa of the stomach is larger and circumscribed in peptic ulcer and the ulcers may be found in the oesophagus, stomach and the small intestine.

**Definition:** Peptic ulcer is a circumscribed ulcer in the mucosal wall of the oesophagus (oesophageal ulcer), stomach (gastric ulcer) and the duodenum (duodenal ulcer). It may also occur at the site of anastomosis. Duodenal ulcers account for 80% of peptic ulcers while gastric ulcers are less common. The erosion may extend to the muscle layer of the stomach and sometimes to the peritoneum and may occur singly or in multiple.

Common sites of ulceration are the lower third of the oesophagus, lesser curvature of the stomach and the first part of the duodenum.

**Incidence:** Peptic ulcer disease is more common in males than females and in people between 40 and 60 years of age. It is relatively uncommon in women of childbearing age but more in menopausal women.

**Causes:** Several factors are responsible for protecting the stomach lining from the action of hydrochloric acid and pepsin. These include:

- The dilution of the gastric acid by the water taken orally
- The buffering effect of some proteins in the food eaten and mucin in the stomach
- The secretion of mucus by the gastric mucosa and the protective coating of the mucosa by mucus
- Natural immunity provided by agglutinins in the blood and tissues especially in people with blood group A and B.

Ulcer would therefore be present where 2 conditions exist:

- gastric / duodenal mucosa is not healthy and is thus less resistant to the action of acid pepsin
- The resting gastric acid (acidity of gastric juice) is increased.

The following causes fall into one or the other of these 2 conditions.

1. Infection with *Helicobacter pylori*
2. Emotional stress and anxiety
3. Excessive secretion of hydrochloric acid and acid-pepsin in the stomach
4. Prolonged food indiscretions especially intake of fatty, over-spiced foods, caffeine and other irritating meals
5. Chronic alcohol intake and smoking
6. Chronic use of non-steroidal anti-inflammatory drugs, Aspirin, steroids etc.
7. Over secretion of the hormone gastrin with over secretion of gastric juices and gastric hyperacidity (Zollinger-Ellison syndrome)
8. Trauma e.g. extensive burns and severe tissue injury
9. Severe shock, severe sepsis and serious debilitating illness e.g. pancreatitis, hepatic disease

*Note: Ulcers caused by stressful events like trauma, shock, severe sepsis and severe illness are also referred to as stress ulcers while ulcer that results specifically from extensive burns is called Curling's ulcer.*

10. Reflux of bile which results from normal ageing causing weakening of the pyloric sphincter
11. Major predisposing factors are:

- Heredity (inherited genetic disposition)
- Blood type -blood group O (duodenal ulcers) and blood group A (gastric ulcers) because these people do not secrete protective blood group antigens and agglutinins

- Personality type (tall, slim, tense perfectionists and worriers)
- stressful occupations

**Pathophysiology:** When the gastric mucosa cannot withstand the digestive action of gastric acid and pepsin, (either because of decreased resistance of the mucosa or increased concentration/ activity of the gastric juice), ulceration of the mucous membrane occurs. The erosion exposes areas of the mucous membrane to the direct action of gastric acids. Moreover the eroded mucosa does not secrete enough mucus to form a protective film over the mucosa and so gastric juices continually corrode and erode the mucosa thus deepening the ulcer. Erosion and ulceration of the oesophageal, gastric and duodenal mucosa causes *epigastric pain* which is related to food. In gastric ulcer the pain occurs after meals and vomiting relieves it so the patient prefers not to eat and may become malnourished while in duodenal ulcer the pain occurs 3 hours after food when the stomach is empty (“hunger pain”) and so the patient eats often to relieve the pain and may gain weight (See Table 3.1). The action of acid pepsin on the ulcer causes *pyrosis* (feeling of heartburn) which is also accompanied by *sour eructation* or burping especially when the stomach is empty. The ulcers may bleed thus causing haematemesis (vomiting of blood in gastric ulcer) or melaena (blood in stool in duodenal ulcer).

**Table 3.1 Showing comparison between gastric and duodenal ulcer**

Characteristics	Duodenal ulcer	Gastric ulcer
1. Incidence: Age Sex: Male: female ratio % incidence	30 to 60 years 2 to 3:1 80% of peptic ulcers	50 years or over 1:1 15% of ulcers
2. Blood group	More common in “O”	No differences
3. Acid secretion	Hypersecretion	Normal to hyposecretion
4. Weight	May have weight gain	May have weight loss
5. Pain	Occurs 2 to 3 hours after meal and common at night	Occurs after meal and rarely at night
6. Vomiting	Uncommon	Common and relieves pain
7. Haemorrhage	Less likely but if presence shows in stool	More likely and shows in vomitus
8. Perforation	More likely	Less likely

9. Malignancy	Rarely occurs	More often than in duodenal
10. Nutritional status	Usually well nourished	Usually malnourished

## NURSING PROCESS RELATED TO THE PATIENT WITH PEPTIC ULCER

### Assessment

1. **Health History:** The patient's history reveals presence of predisposing factors e.g. use of aspirin and other irritating drugs, food indiscretions or associated disorders. The patient's history will distinguish between gastric and duodenal ulcer. The patient with gastric ulcer reports epigastric pain after eating, (pain is relieved by vomiting) and recent weight loss because he has developed an aversion to food. The patient with duodenal ulcer reports epigastric pain when he is hungry (especially in the night) and as pain is relieved by eating he eats often and has recently gained weight.
2. **Clinical Manifestations:** The symptoms of peptic ulcer include:
  - a) Gnawing, aching or burning epigastric pain which radiates to the back. In duodenal ulcer the pain is more severe at night when the stomach is empty and gastric acid stimulates the nerve endings in the eroded areas of the mucosa. Food in this case neutralizes the acid and relieves the pain. In gastric ulcer, pain occurs after food because food irritates the ulcers and when the patient vomits he feels relieved. Therefore, pain is relieved by food in duodenal ulcer but aggravated by food in gastric ulcer.
  - b) Pyrosis (heartburn or burning sensation in the mid-epigastrium) with sour eructation (burping/ regurgitation)
  - c) Feeling of fullness or distension in the upper abdomen
  - d) Nausea and vomiting occur frequently in gastric ulcer but are rare in duodenal ulcer. In gastric ulcer the vomitus contains undigested food
  - e) Diarrhoea or constipation may occur but often as a result of diet or medications.
  - f) If the ulcer erodes blood vessels in the stomach or intestine there is bleeding which is seen in the vomitus (oesophageal and gastric) or the stool (duodenal). Statistics show that only 15% of patients with gastric ulcers experience bleeding.
3. **Physical examination:**

- *Inspection* reveals abdominal distension, pallor if the patient is anaemic from bleeding ulcer, blood in vomitus and tarry stools.
- *Palpation* of the upper abdomen reveals tenderness and pain in the epigastrium
- *Auscultation* elicits hyperactive bowel sounds

#### 4. Diagnostic tests include:

- a) Upper GI series e.g. Barium swallow and barium meal reveals an ulcer in the oesophagus or stomach or duodenum
- b) Upper GI endoscopy (oesophagoscopy, gastroscopy or duodenoscopy) confirms the presence of an ulcer. Endoscopy is a major diagnostic test for peptic ulcer and through it a biopsy may be taken for cytological examination.
- c) Upper GI x-rays may reveal large ulcers but not small ones
- d) Laboratory analysis of:
  - stool may reveal occult blood;
  - blood (serological test) shows antibodies to *Helicobacter pylori*; (microbiological) blood culture reveals the bacteria if these are the causative factors. Biochemical assays will reveal high serum gastrin in Zollinger-Ellison syndrome.
- e) Gastric secretory studies may reveal hyperchlorhydria (excess acid secretion) in Zollinger-Ellison syndrome
- f) Carbon 13 urea breath test detects *Helicobacter pylori*. *H. pylori* contains the enzyme urease which breaks down orally administered urea containing radioisotope Carbon 13 and this can be measured in the breath.

#### Nursing Diagnosis

1. Acute abdominal pain related to irritation of gastric mucosa by acid pepsin
2. Imbalanced nutrition: less than body requirements, related to nausea and anorexia
3. Fluid volume deficit related to vomiting
4. High risk for blood volume deficit related to GI bleeding.
5. Anxiety related to loss of blood in stool or vomitus.
6. Knowledge deficit about how to prevent symptoms and manage the disease

#### Planning and Implementation

Objectives of care:

- To relieve epigastric pain

- To maintain adequate nutrition
- To heal the ulcer
- To prevent recurrence and complications

Management is symptomatic emphasizing physical rest, drug therapy, dietary changes and stress reduction.

### **Nursing Management**

1. Reduce stress and anxiety by encouraging the patient to rest and relax. He should have regular rest periods during the day and avoid a rushed lifestyle
2. Assess patient's pain, nutritional status, vomitus and stool for blood, fluid intake and output and vital signs (tachycardia and hypotension may indicate GI bleeding). Monitor for complications e.g. GI bleeding, perforation and penetration of the ulcer, pyloric obstruction etc
3. Diet: maintain optimal nutritional status especially in gastric ulcer where the patient may be malnourished. Encourage patient to take bland (non-irritating) but nourishing meals. Such meals should be low residue, low in fat and non-spicy with high vitamin C. Bland meals are aimed at preventing oversecretion of gastric acid. Offer small meals at frequent intervals if the patient is vomiting or has anorexia. Advise patient to avoid irritating substances e.g. caffeine, alcohol, spicy foods etc. and comply with dietary restrictions.
4. Give psychological support by assessing level of anxiety, encouraging patient to verbalise anxiety and express their fears openly. Explain diagnostic tests, dietary modification and medications; offer reassurance and interact with the patient in a calm, relaxed manner. Identify and encourage appropriate coping mechanisms and relaxation techniques.
5. Administer prescribed medications.
6. Patient education: counsel
  - On the importance of compliance with dietary modification and medication regimens
  - To eat meals at regular times and in a relaxed manner (he should not rush meals) and to lie down for 20 to 30 minutes after meals if possible and to avoid overeating.
  - To avoid stress and tension and to stop smoking
  - To take antacids 1 hour after meals
  - Review with the patient foods that are problematic to him and counsel him to avoid substances that are irritating to the gastric mucosa or have acid-producing or gas-forming potentials e.g. caffeine, alcohol, spicy foods, carbonated drinks, smoking, cream, raw, unripe fruits and drugs like steroids, Aspirin, non-steroidal anti-inflammatory drugs (NSAIDs) etc.

## Medical Management

Medical management may involve the use of drugs or if these fail surgery is performed.

A. The **drugs** usually prescribed by the doctor include:

1. Histamine-receptor antagonists e.g. cimetidine (Tagamet), ranitidine (Zantac) to reduce gastric secretions
2. Antacids / alkalis to reduce gastric acidity
3. Coating agents e.g. sucralfate which forms complexes with proteins at the base of the ulcer forming a protective coat that prevents further digestive action of acid pepsin. These are also called anti-ulcer agents and **should not be given within 30 minutes of antacids.**
4. Anticholinergics e.g. propantheline inhibit the vagus nerve and reduce gastrin production.
5. Gastric acid inhibitors e.g. lansoprazole (Prevacid) solutab 30 mg *bid* or pantoprazole sodium (Protonix) sustained release tablets 40 mg daily. These reduce gastric acid production and are given 30 minutes to 1 hour before meals
6. Antispasmodics e.g. buscopan, probanthine to reduce spasms that cause pain
7. Combination of Bismuth and 2 antimicrobial agents e.g. tetracycline and metronidazole (Flagyl) or amoxicillin and metronidazole (Flagyl). This combination eradicates *Helicobacter pylori* in the gastric mucosa

If GI bleeding occurs emergency treatment is given by passing a nasogastric tube through which iced saline is introduced as lavage.

If medical treatment fails, **surgery** is performed. The type of surgery done depends on the location and extent of the ulcer, and these include:

1. Subtotal gastrectomy with gastro-duodenostomy (Bilroth I operation) or gastro-jejunostomy
2. Total gastrectomy with anastomosis of the lower oesophagus to the jejunum (oesophago-jejunostomy or Bilroth II operation)
3. Vagotomy and pyloroplasty (widening of the pyloric antrum)

**Pre-operative care** involves explaining the surgery to patient, obtaining informed consent, stabilizing the nutritional and fluid status, giving psychological support, giving cleansing enema the night before and inserting nasogastric tube on the morning of operation.

**Post-operative care** involves adequate positioning, monitoring vital signs first  $\frac{1}{4}$  hourly and later  $\frac{1}{2}$  hourly until patient's condition

stabilizes. Also ensure adequate fluid replacement and as bowel sounds return, remove nasogastric tube and start oral feeding. Oral feeding should be done gradually and patient should chew food properly and lie down for about 30 minutes after meals to prevent dumping syndrome. The wound should be cared for by re-enforcing the dressing if there is bleeding, shortening and removing the drainage tube when no longer draining and removing stitches as ordered by the doctor.

**Evaluation:** Peptic ulcer is usually an acute condition and subsides with proper management which heals the ulcers. However some complications may occur e.g. haemorrhage, perforation (erosion of the ulcer into the peritoneal cavity), penetration (erosion of the ulcer into the adjacent structures like the pancreas) and pyloric obstruction. After surgery there may be haemorrhage, dumping syndrome and vitamin B<sub>12</sub> deficiency.

### SELF ASSESSMENT EXERCISES 3

1. Discuss the class, action, dosage, side effects and nursing responsibilities in relation to the following drugs: Cimetidine (Tagamet), Aluminium hydroxide (Aludrox),
2. What would you advise a patient with gastrointestinal reflux disease to do after eating?
3. Describe the indications and nurse's roles and responsibilities before, during and after barium meal.

### 3. INTESTINAL OBSTRUCTION

**Definition:** Intestinal obstruction is the partial or complete blockage of the lumen of the small intestine or the large intestine. Only 15% of intestinal obstruction occurs in the large intestine. This blockage prevents the flow of intestinal contents through the tract. Complete obstruction in any part of the bowel, if untreated, can cause death within hours from shock and vascular collapse.

**Causes:** intestinal obstruction may be in the form of:

- a) **Mechanical obstruction:** mechanical obstructions in the small bowel are in the form of adhesions, strictures and *strangulated hernias* and for large bowel obstruction occurring mostly in the sigmoid colon or caecum, mechanical obstruction is caused by *cancer of the colon*, stenosis, *intussusception*, *volvulus*, colonic abscesses, diverticulitis, inflammatory bowel disorders and foreign bodies e.g. worms, gallstones and fruit seeds. Intussusception is a condition in which a portion of the bowel invaginates (prolapses) into the lumen of an adjacent bowel portion. It is the most common cause of intestinal obstruction in infants. Volvulus is the twisting (torsion) of a loop of the intestine on itself commonly occurring in the sigmoid colon. Hernia is a protrusion of a viscus or portion of the organ through a weak point in the covering structure or an opening in the cavity. It may be inguinal, umbilical, femoral, incisional, epigastric, lumbar or hiatus and may be strangulated or non-strangulated.
- b) **Functional obstruction** is caused by paralytic ileus, extensive abdominal surgery (most common cause especially in the small bowel), rigorous enema, muscular dystrophy, spinal cord lesions, Parkinson's disease and thrombosis occurring in blood vessels supplying the intestines.

**Pathophysiology:** Despite the cause of the obstruction, the underlying pathology is the same. When intestinal obstruction occurs, air, gas and fluid collect near the site above the obstruction. As the bowel tries to force its content through the obstruction, injury results causing distension which blocks venous return and inhibits absorption of fluid by the mucosa. Increasing distension causes pressure within the intestinal lumen with decrease in venous and arteriolar capillary pressure, oedema, congestion, necrosis (tissue death) and eventual perforation of the intestinal wall resulting on peritonitis. Reflux vomiting occurs with dehydration, shock and acidosis. If necrosis occurs, the condition is life threatening.

## **NURSING PROCESS RELATED TO THE PATIENT WITH INTESTINAL OBSTRUCTION**

### **Assessment**

1. **Health History** reveals predisposing factors like abdominal surgery, gallstones etc. Sometimes there is no predisposing factor reported.
2. **Clinical Manifestations** The location of the obstruction determines the symptoms experienced. In small bowel obstruction the onset of

symptoms is sudden, while onset is gradual in large bowel obstruction. Symptoms include crampy abdominal pain that is colicky and wavelike, anorexia, nausea and severe vomiting (which may consist of gastric and bile contents) with hypovolemic shock and dehydration; constipation, hiccups and abdominal distension and tenderness. The lower the site of the obstruction the more marked the abdominal distension. If obstruction is complete vomiting of faecal contents is reported because strong peristaltic waves propel bowel contents towards the mouth instead of the rectum. In this case the patient may pass mucus and blood but no faecal matter, no flatus and no bowel sounds.

### 3. Physical Examination

- *Inspection* reveals a distended abdomen
- *Palpation* may disclose abdominal tenderness and if the cause of the obstruction is strangulation, rebound tenderness may be noted.
- *Auscultation* of the abdomen in the early stages may disclose decreased bowel sounds but this sign disappears as the disorder progresses. Later in the disease auscultation may detect strong bowel sounds and borborygmus (a rumbling noise in the abdomen caused by propulsion of gas through the intestines).

### 4. Diagnostic Tests

- Barium enema will reveal an obstruction because the barium will stop at the site of the obstruction. If volvulus is the cause barium enema will reveal air-filled colon.
- Abdominal x-rays confirm intestinal obstruction and reveal large areas of gas or fluid in the bowel
- Endoscopy (sigmoidoscopy, colonoscopy) may reveal the cause of the obstruction. Endoscopy is contraindicated if perforation is suspected.

### Nursing Diagnosis

1. Imbalanced nutrition: less than body requirements, related to inability to eat.
2. Fluid volume deficit (actual) related to vomiting.
3. Acute pain in abdomen related to intestinal pressure caused by obstruction. The pain may also be related to retention of gas and fluids in the abdomen or if surgery is done it may be related to severance of nerves during incision.
4. Constipation related to obstruction in the bowel preventing the passage of faecal matter to the rectum.
5. Anxiety related to abdominal distension and pain.

6. Altered gastrointestinal perfusion related to decreased blood flow.

### **Planning and Implementation of Care**

Objectives of care:

- To relieve abdominal distension.
- To prevent /treat shock.
- To correct fluid and electrolyte deficits.
- To prevent / treat peritoneal infection.

### **Nursing Management**

Intestinal obstruction may be fatal; therefore the nurse needs to give skillful supportive care and keen monitoring.

1. Keep the patient in semi-Fowler's or Fowler's position (elevate head) as much as possible to relieve pressure on the diaphragm.
2. Encourage the patient to rest.
3. Restrict oral intake until bowel function returns. Meanwhile ensure that adequate fluid and electrolytes are given intravenously. Maintain fluid intake and output chart.
4. Since nasogastric tube is usually inserted to decompress the bowel you should:
5.
  - Provide frequent mouth care to help keep the mouth mucosa moist.
  - Maintain continuous nasogastric suction by ensuring that the tube is not kinked or obstructed in any way. If it is clogged, irrigate the tube with 0.9% sodium chloride (normal saline) solution to ensure patency.
6. Monitor:
  - Vital signs (tachycardia and hypotension indicate dehydration or peritonitis) while fever may indicate strangulation. Shortness of breath or slow, shallow respiration followed by deep, rapid breathing may indicate metabolic alkalosis while fever and chills indicate infection. Observe closely for signs of shock
  - Fluid intake and output (excess fluid output indicates high risk for fluid volume deficit)
  - Measure abdominal girth daily to determine reduction or otherwise of abdominal distension
  - Auscultate for bowel sounds: absence of bowel sounds indicate paralytic ileus while high-pitched sounds with rushes indicate mechanical obstruction.
  - Nutritional status

- Assess patient's pain continually bearing in mind that colicky pain that suddenly becomes constant could signal perforation.
- Nasogastric output for colour, amount and consistency.
- If a weighted tube is inserted, check regularly to make sure that it is advancing
- 7. Administer medications e.g. analgesics, antibiotics etc as ordered.
- 8. Provide psychological support
- 9. If surgery is scheduled, prepare patient for surgery as required and provide appropriate post-operative care.
- 10. Patient education on:
  - Colostomy cares if colostomy is done. This should include teaching the patient how to apply and remove the colostomy appliance; how to irrigate the colostomy to remove gas, mucus and faeces from the colon; how to maintain a positive self image and the proper diet to take.
  - Proper use of medications

### **Medical Management**

Even though surgery is usually the treatment of choice (except in paralytic ileus), nonsurgical treatment may be attempted in partial obstruction.

*Nonsurgical Treatment* includes:

- Decompression of the bowel to remove gas and fluids through a nasogastric tube attached to low-pressure continuous suction. The doctor may prefer to insert a weighted nasointestinal tube such as Cantor or Miller-Abbot or Harris tube.
- Correction of fluid and electrolyte deficits
- Administration of broad-spectrum antibiotics, analgesics and sedatives

*Surgical intervention* is done for complete obstruction, adhesions, cancer, necrosis and strictures. The type of surgery depends on the cause of the blockage. If strangulated hernia and adhesions are the cause, the surgical procedures involve repair of the hernia and dividing the adhesions. If cancer of the colon is the cause, colonic resection is done with anastomosis with a temporary or permanent colostomy. Preparation for surgery is usually lengthy to ensure correction of fluid and electrolyte deficits and decompression of the bowel to relieve vomiting and abdominal distension.

### **Evaluation**

If not properly handled intestinal obstruction may perforate resulting in peritonitis, septicaemia, metabolic alkalosis and acidosis and either hypovolaemic or septic shock, all of which may lead to death if not treated.

#### **SELF ASSESSMENT EXERCISES 4**

1. With a large well-labelled diagram, describe the human stomach.
2. List the hormones of the gastro-intestinal tract and their actions.
3. Which of the causes of peptic ulcer occur as a result of unhealthy mucosa and which ones result because of increased secretion of gastric acids?
4. Gastritis and peptic ulcer are similar in terms of symptoms and management. Discuss the major differences between the two.
5. Discuss the similarities and differences between intussusception, volvulus and hernia.

#### **4.0 CONCLUSION**

Having completed the course material on this unit, you are expected to have understood the pathophysiology, signs and symptoms, assessments, nursing and medical management and complications that may occur in medical-surgical conditions of the mouth, oesophagus, stomach and intestines.

#### **5.0 SUMMARY**

This unit has discussed the common medical and surgical disorders of the gastrointestinal tract and how they affect ingestion, digestion, utilization of nutrients and elimination of wastes.

#### **6.0 TUTOR-MARKED ASSIGNMENT**

1. With a well labelled diagram describe the human stomach.
2. Mrs. Fina, a 30-year-old banker with 2 children aged 2 years and 9 months, has been admitted into your ward with a history of severe gnawing abdominal pain which is aggravated by food intake, burning sensation in the epigastric area and constant belching. A diagnosis of gastric ulcer is made.
  - a) Using 3 priority nursing diagnoses draw up a nursing care plan for Mrs. Fina.
  - b) Discuss the education you would give to Mrs. Fina after discharge bearing in mind her profession

- c) The patient complains of belching and acid reflux despite treatment. Discuss the nursing care and advice you would give the patient to deal with this..

## **7.0 REFERENCES/FURTHER READINGS**

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## **UNIT 4 MEDICO-SURGICAL CONDITIONS AFFECTING THE ACCESSORY ORGANS OF DIGESTION**

## CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Review of the Structure and Functions of the Liver, Biliary Tract and Pancreas
  - 3.2 Medico-Surgical Disorders of the Liver, Biliary Tract and Pancreas
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### 1.0 INTRODUCTION

In the last unit you learned about conditions affecting digestion in organs found along the gastrointestinal tract. In this unit you will consider other conditions affecting digestion and metabolism in accessory organs of digestion. Abnormalities in these organs tend to be progressive and require long-term management and dietary and lifestyle changes.

### 2.0 OBJECTIVES

After going through this unit, you should be able to:

- describe the structure and function of the liver, pancreas and gall bladder
- describe the pathophysiology of the medical and surgical conditions affecting the liver, pancreas and gall bladder in relation to their effects on digestion and utilization of foods
- discuss the management of patients suffering from medical and surgical conditions of the liver, pancreas and gall bladder using the nursing process approach.

### 3.0 MAIN CONTENT

The content of this unit includes **conditions affecting the liver, biliary tract and pancreas (exocrine function).**

### 3.1 Review of the Structure and Functions of the Liver, Biliary Tract and Pancreas

The ***liver*** is a large organ located in the upper right quadrant of the abdomen just below the diaphragm. It is the largest organ in the body weighing about 1.5 kilograms in the adult which represents 2% of the body weight. Macroscopically, the liver is made up of four lobes and microscopically it consists of lobules (functional units) which contain specialized cells called hepatocytes which are arranged around a central vein. Phagocytic cells, called Kupffer cells, are also found in the liver and these engulf bacterial cells that enter the liver. Located between the lobules are very small bile ducts (canaliculi) which join together to form the larger bile ducts which in turn form the hepatic duct. The hepatic duct joins with the cystic duct from the gallbladder to form the common bile duct which empties into the duodenum at the point where the main pancreatic duct (duct of Wirsung) also empties into the duodenum. The point at which these 2 ducts empty into the duodenum is called the ampulla of Vater and the sphincter of Oddi controls the release of both pancreatic juice and bile into the duodenum. Blood supply to the liver is through the hepatic artery (oxygenated blood) and the portal vein (deoxygenated blood high in food nutrients) while the hepatic veins drain blood from it. The liver facilitates digestion and metabolism of glucose, protein and fat; metabolizes drugs, detoxifies chemicals and other harmful substances, synthesizes blood clotting factors, destroys worn-out red blood cells and bacteria in the blood stream (Kupffer cells), forms bile (hepatocytes) and stores iron and vitamins.

The ***gallbladder*** is a small, pear-shaped organ found on the undersurface of the liver and has an average capacity of 40-50 ml. Its walls are made of smooth muscle, connective tissue and mucous membrane lining. It is responsible for storing and concentrating bile. When the stomach and duodenum are empty of food, the sphincter of Oddi remains contracted and bile remains in the gallbladder. But when food containing fat and partially digested protein enters the duodenum, a hormone called cholecystokinin-pancreozymin (CCK-PZ) is secreted by the cells of the duodenal mucosa. This stimulates the smooth muscles of the gallbladder to contract and eject bile and the sphincter of Oddi to relax to allow the bile flow into the duodenum.

The ***pancreas*** is a fish-shaped gland which lies behind the stomach and has a head (which lies in the curve of the duodenum), a body and a tail. It has 2 distinct types of functional cells – one type secretes directly into the blood stream (endocrine part) and the other secretes into small ducts (exocrine part) which drain into the main duct called pancreatic duct or duct of Wirsung. The exocrine part of the pancreas is involved in digestion and is made up of many lobes whose cells secrete pancreatic

juice containing pancreatic amylase (responsible for carbohydrate metabolism), pancreatic lipase (hydrolyzes fats) and pancreatic trypsin (splits protein).

### **3.2 Medical-Surgical Disorders of the Liver, Biliary Tract and Pancreas**

#### **1. HEPATITIS**

**Definition:** This is an inflammatory condition of the liver marked by destruction of the cells of the liver resulting in jaundice.

**Causes:** It may be caused by:

1. Invasion of the liver by viruses, bacteria or amoeba (*Entamoeba histolytica*)
2. Exposure to toxic chemicals like carbon tetrachloride and some drugs (called toxic hepatitis).
3. Chronic alcoholism

Hepatitis may be viral or non-viral. Non-viral Hepatitis is referred to as toxic hepatitis and is caused by toxic materials and chemicals e.g. carbon tetrachloride, phosphorus, arsenic and drugs like acetaminophen, sulphonamides, isoniazid, some anaesthetic agents, antimetabolites etc. and some gases like halothane. Toxic hepatitis is not infectious but degenerative changes occur in the liver.

*Viral hepatitis is more common and will be discussed in detail in this unit.*

Five types of viral hepatitis have been identified: Hepatitis A (HAV), Hepatitis B (HBV), Hepatitis C (HCV), Hepatitis D (HDV) and Hepatitis E (HEV). Hepatitis A and E are similar in mode of transmission and other characteristics while hepatitis B, C and D are similar. The comparison of the various forms of viral hepatitis is shown on Table 4.1.

**Pathophysiology:** When the liver is inflamed from any cause, the cells of the liver become swollen and congested and these interfere with normal bile production and flow thus causing jaundice. Also the liver becomes unable to carry out its functions of digestion, detoxification etc. Liver enzymes rise sharply because of necrosis and urine reveals an excess of urobilinogen. However in most cases the liver cells recover with complete regeneration of cells with minimal scarring. Because of interference with the metabolism of carbohydrates, proteins and fats the patient develops anorexia, weight loss, muscle wasting and fatigue.

Spontaneous bleeding may occur because of reduced synthesis of clotting factors.

If there is massive destruction of the liver tissue, fulminant hepatitis results and this is often fatal.

## **NURSING PROCESS RELATED TO THE PATIENT WITH HEPATITIS**

### **Assessment**

- 1. Health History:** You need to investigate the patient's history for source of transmission. Depending on the type of hepatitis there is history of exposure to predisposing factors like eating uncooked or inadequately cooked shellfish (HAV and HEV), recent blood transfusion or haemodialysis (HBV, HCV, HDV), use of sharp instruments e.g. for tattooing, ear piercing, recent sharps injury in health care workers, chronic alcohol use, taking certain drugs e.g. acetaminophen, ketoconazole etc., exposure to toxic chemicals and certain lifestyle behaviours that increase the risk of exposure e.g. IV drug use (HBV and HCV). The patient also gives a history of fat intolerance, anorexia, nausea and abdominal pain.
- 2. Clinical Manifestations:** Hepatitis may have acute onset with fever (hepatitis A and E) or insidious onset (Hepatitis B, C, D). Hepatitis B may occur without symptoms.

Acute hepatitis manifests in stages –

- The prodromal (pre-icteric) stage, which is characterized by low grade fever, flu-like symptoms, fatigue, anorexia, myalgia (muscle pain), nausea with or without vomiting, anorexia, weight loss, aversion to strong odours and cigarette smoke, mild abdominal pain and in Hepatitis B and C, rashes. This stage lasts for 1 to 5 days before the onset of jaundice.
- Clinical jaundice stage, which is characterized by jaundice (though some patients may be anicteric i.e. without jaundice at all), pruritus (skin itching), fat intolerance, dark coloured urine and if there is obstruction in the flow of bile, clay-coloured stools. Fatigue, malaise nausea (especially late in the day), vomiting and anorexia tend to continue in this stage. There may also be bleeding tendencies (petechiae, purpura haematuria, malaena etc.) and abdominal pain and tenderness due to enlargement of the liver and spleen. This stage may which lasts for 1 to 2 weeks.
- Post-icteric stage (recovery stage) which lasts for 2 to 12 weeks or longer in hepatitis B, C and E, is characterized by decrease in the

symptoms of the icteric stage and decrease in liver enlargement and tenderness although the patient still feels easily tired.

**Jaundice** is the most common symptom of hepatic, biliary and pancreatic diseases. Jaundice is the yellowish discolouration of the sclera, skin and mucous membranes, which is an indication of excess bilirubin in the blood. There are many types of jaundice – hepatocellular (associated with intrinsic liver disease), obstructive (caused by interference to the flow of bile) and haemolytic jaundice (caused by excess destruction of red blood cells).

### 3. Physical Examination

- *Inspection* of the skin reveals jaundice, petechiae, dilated abdominal veins, and abdominal distension. Inspection of urine and faeces reveals dark-coloured urine and clay-coloured stools.
- *Palpation* of the abdomen may reveal enlarged spleen and liver, tenderness and pain over the liver and sometimes spleen.

### 4. Diagnostic Tests

- Liver function tests reveal an increase in liver enzymes e.g. Serum Aspartate aminotransferase (formerly SGOT), Serum Alanine aminotransferase (formerly SGPT), serum alkaline phosphatase
- Serum bilirubin level is increased
- Prothrombin time is prolonged
- Serology reveals the presence of hepatitis B surface antigens (HBsAg) and anti hepatitis B antibodies (anti- HBs) in hepatitis B. In hepatitis A serology shows a rise in anti-HAV antibodies
- Stool specimen is positive for HAV in hepatitis A

### Nursing Diagnosis

1. Activity intolerance, R/T fatigue and malaise caused by decreased metabolism of nutrients.
2. Risk for imbalanced nutrition R/T decreased metabolism of nutrients. It may also be related to anorexia or vomiting.
3. Risk for impaired skin integrity R/T pruritus resulting from accumulation of bile salts in the skin
4. Deficient knowledge of disease process and treatment modalities

### SIMILARITIES AND DIFFERENCES BETWEEN TYPES OF HEPATITIS

Characteristics	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis D	Hepatitis E
Common name	Infectious	Serum hepatitis	Non-A or	Delta	

	hepatitis		non-B	hepatitis	
Causes	Hepatitis A virus (HAV)	Hepatitis B virus (HBV)	Hepatitis C virus (HCV)	Hepatitis D virus (HDV)	Hepatitis E virus (HEV)
Mode of transmission	Ingestion of HAV in infected food, water, milk, uncooked shellfish. Transmission is <i>faeco-oral</i> and the condition is common in situations of poor sanitation	Contact with contaminated <b>blood &amp;</b> blood products through injection, <b>sexual</b> contact, mucous membranes ( <b>percutaneous</b> ), mother-to-child transmission, may occur as occupational hazard in health care workers	Same as for hepatitis B. accounts for most post-transfusion hepatitis cases	Same as for hepatitis B. found in people frequently exposed to blood & blood products	Through enteric transmission as in Hepatitis A. the virus is infrequently shed in faeces so is difficult to detect in stool exam. Usually a co-infection with or super-imposed on hepatitis A
Risk factors	Environmental pollutants	Frequent exposure to blood, blood products, multiple unsafe sexual partners, needle stick injuries	Same as for hepatitis B	Same as for hepatitis B	Same as for hepatitis A
Incidence	Incidence is increasing in homosexuals and people with immune suppression	High in IV drug users, those exposed to frequent blood transfusion e.g. haemophiliacs, those with sickle cell disease etc.; general surgeons, dentists & lab workers are at risk	Same as for Hepatitis B		Same as for Hepatitis A. also common in people living in endemic areas like India, East Africa, and Central America
Incubation period	Short – 15 to 50 days (average 30 days)	Long 30 to 160 days (average 90 days)	14 to 115 days (average 50 days)	Same as for hepatitis B	
Contagion	High	High	High		Not so high
Chronic carrier state	Very rare	Common	Common		Rare
Prophylaxis	Gamma globulin	Hepatitis B Immunoglobulin and Hepatitis B vaccine	None		None

Outcome	Usually mild with low fatality rate. With treatment there is full recovery without chronicity	May be severe with a relatively higher fatality rate and possibility of chronicity	Same as for Hepatitis B	Similar to HAV
Prevention of transmission	Environmental sanitation, food hygiene, mandatory reporting (notification of health authorities)	Continued screening of blood donors for HBV, use of disposable syringes, use of gloves when handling blood products	Same as for Hepatitis B	Same as for hepatitis A

### Planning and implementation

The objectives of management include:

- To ensure adequate rest
- To protect the liver from chronic damage
- To maintain adequate diet

**The treatment of hepatitis involves avoidance of hepatotoxic materials (both biological and chemical), rest and supportive care.**

### Nursing Management

1. Encourage bed rest in an adequately ventilated environment, especially in the early stages of the illness. There is need to schedule treatment so that patient can rest between activities.
2. Hepatitis is a notifiable disease therefore the health authority should be notified about all cases of hepatitis. The patient's recent contact should be traced and monitored and asked to come to the hospital to receive prophylaxis.
3. Adequate isolation practices should be put in place depending on the type of hepatitis and the route of transmission. For hepatitis A and E enteric precautions are necessary (use of protective gown and gloves when faecal soiling is likely; proper hand washing after caring for patient or dealing with faeces) and double bagging of faeces-soiled items and labelling them "enteric precautions". For hepatitis B, C and D universal blood and body fluid precautionary practices should be put in place. These include hand washing, use of gown and gloves when direct contact with blood and body fluids is likely; proper disposal of sharps used in treatment (in puncture-resistance

containers), double-bagging of linen soiled with blood and other body fluids and labelling them “blood and body fluids precautions”.

4. Monitor and observe
  - Patient’s vital signs, fluid intake and output (4-hourly) and body weight (daily).
  - Observe the conjunctiva for degree of jaundice (if any).
  - Observe urine and stools for colour, consistency and amount and frequency of defecation.
  - Watch for signs of complications e.g. change in level of consciousness, ascites and dehydration.
5. Diet and fluids: Meals should have high amount of calories (to provide energy), protein (to help regenerate the liver) and vitamins (especially B complex and C) and copious fluids (up to 4 litres daily to replace loss). ***If the patient has symptoms like lethargy, confusion and other mental changes protein intake should be reduced.*** The fluids may be given intravenously if patient is vomiting and cannot tolerate oral fluids. In this case Dextrose 5% is given, sometimes with supplemental vitamin B complex solution (total dose) added to the drip. Meals should also be easily digestible and given in small amounts at frequent intervals.
6. Provide emotional care whereby the patient is encouraged to verbalize his/her fears while you try to relieve them through reassurance, empathetic care etc.
7. Patient teaching should include:
  - The patient with hepatitis B, C or D should be cautioned to avoid unprotected sexual relations and donation of blood until the doctor confirms that the danger of contagion is past. The patient with hepatitis A or E should be encouraged not to handle food or share food or hand towels with others.
  - Discuss isolation procedures and what patient should do to prevent transmission to others
  - Meticulous hygiene especially thorough and frequent hand washing, especially after defecation
  - Stress that complete recovery may take time as it usually takes the liver up to 4 months or more to regenerate itself and return to normal functioning
  - Emphasize the importance of rest and good nutrition (high calorie, high protein diet with copious fluid).
  - Counsel patient to abstain from alcohol and sedatives while the disease is on
  - All contacts should be brought to the hospital for prophylaxis
  - Since some medications may precipitate a relapse, the patient should be advised to check with his doctor before taking any medication.
  - Advise to come back to the hospital for follow up as scheduled or whenever there is a problem.

## Medical Management

No specific drug therapy is available for hepatitis. In toxic hepatitis, treatment is by prompt withdrawal of the offending chemical or drug. Often treatment of viral hepatitis is symptomatic and medications given to the patient include:

1. Antibiotics to deal with the liver infection. Such antibiotics should be liver-friendly.
2. Anti-pruritic agents e.g. cholestyramine (a resin which sequesters bile salts and prevents itching).
3. Liver-friendly analgesics for pain
4. Anti-emetics to deal with nausea and vomiting

## Evaluation

If effectively managed the illness resolves without any complications. However fulminant hepatitis may occur in 1 % of cases, resulting in liver failure.

## 2. CIRRHOSIS OF THE LIVER (HEPATIC CIRRHOSIS)

**Definition:** Liver cirrhosis is a chronic disease of multiple aetiology characterized by *diffuse destruction* of the parenchyma cells of the liver, *nodular degeneration* of the liver cells and *overgrowth of fibrous tissue*. The disease disorganizes the liver architecture (alters structure and vasculature), impairs blood and lymph flow and causes hepatic insufficiency. It therefore disrupts the structure and functions of the liver.

### Types of Liver Cirrhosis and their Causes:

1. Micronodular cirrhosis (Laennec's disease) which is also called alcoholic or nutritional cirrhosis. This is the most common type of cirrhosis globally and the *scar tissue* is widespread and usually *surrounds the portal areas*. It is caused by chronic alcoholism, especially in the absence of proper diet; extreme nutritional deficiency, especially of alpha-1- antitrypsin, protein and vitamins.
2. Macronodular (post-necrotic) cirrhosis which is caused by viral hepatitis and exposure to toxins resulting in massive loss of liver cells with *broad bands of scar tissue throughout the liver*. This is the 2<sup>nd</sup> most common type globally even though in some countries where viral hepatitis is very prevalent or there is presence of toxins

polluting the water and food sources, it may be the most common type. It is caused by acute viral hepatitis types B and C, metabolic disorders and effect of toxic chemicals and hepatotoxins e.g. arsenic, carbon tetrachloride, phosphorus, lead etc.

3. Biliary cirrhosis, caused by congestion in the bile ducts resulting in chronic obstruction to bile flow and **scarring around the bile ducts**. This is caused by obstruction of the bile ducts, effect of chronic stasis of bile flow within the intra-hepatic ducts and autoimmunity.
4. Cardiac cirrhosis occurs when there is congestion /failure in the right side of the heart. This causes congestion in the portal vein and results in backflow of blood with congestion in the liver. Cardiac cirrhosis is caused by atrio-ventricular valve disease, prolonged constrictive pericarditis and cor pulmonale.
5. Congenital cirrhosis is caused by congenital deposition of iron (haemochromatosis), and copper (Wilson's disease) on the liver and congenital anaemia especially in the form of thalassaemia.
6. Idiopathic cirrhosis is one in which the liver tissue becomes scarred without any known cause.
7. Other causes of cirrhosis include Glucose-6-Phosphate Deficiency (G-6-P-D), fructose intolerance and bilharzial worms.

### **Incidence of Liver Cirrhosis**

Micronodular (Laennec's) cirrhosis is more common in males between 40 and 60 years than females. 10 to 15% of people with chronic alcoholism develop cirrhosis and more than 65% of cases of cirrhosis are alcohol-related. Cirrhosis is the 4<sup>th</sup> leading cause of death in countries with no restriction on alcohol use.

### **Pathophysiology**

When there is adequate nutrition, the liver easily copes with the effect of toxins, viruses and bacteria. But when the liver is overwhelmed by the presence of toxic substances, viruses etc. the liver cells become irritated; and in the presence of malnutrition (inadequate protein and vitamins), the cell irritation results in fatty degeneration and necrosis of the cells. The destroyed liver parenchyma becomes progressively replaced by fibrous (scar) tissue until most functional tissue is gone. The excess fibrous tissue drags on the liver capsule resulting in a hard, irregular outline with nodular consistency (hobnail liver). The fibrosis:

- Interferes with venous return from the liver resulting in **hepatic congestion**, portal vein obstruction and consequently **portal hypertension**
- Impairs lymph flow in the lymphatic bile duct channels.

The above 2 factors result in the following effects:

- **Hepatic insufficiency** (impaired liver function)
- Reverse flow of blood with back pressure on the superior rectus, oesophageal and umbilical veins resulting in bleeding oesophageal varices
- Pressure on the inferior vena cava and subsequent right heart failure and later congestive heart failure (with ascites and oedema of the lower limbs)
- Incomplete clearing of metabolic wastes resulting in accumulation of nitrogenous substances and bilirubin in the blood. The liver cells fail to detoxify and convert ammonia to urea and so ammonia is absorbed from the GI tract and accumulates in the blood. This irritates the brain causing **hepatic encephalopathy** (hepatic brain dysfunction and damage) resulting in hepatic coma which if not adequately controlled leads to death.

## **NURSING PROCESS RELATED TO THE PATIENT WITH HEPATIC CIRRHOSIS**

### **Assessment**

1. **Health History:** There is history of risk factors e.g. long-term alcohol use, inadequate intake of food over a period of time, past episode of viral hepatitis and exposure to toxic agents like lead and arsenic. The patient gives a history of pains in the right upper quadrant of the abdomen, chronic flatulent dyspepsia and weight loss.
2. **Clinical Manifestations (Signs and Symptoms):** The symptoms of cirrhosis depend on the severity of the disease. In *compensated* cirrhosis, the symptoms are usually mild with vague symptoms but in the *decompensated* form, the symptoms are severe because of failure of the liver to synthesize clotting factors and proteins and obstruction to the flow of blood through the damaged liver thus setting up portal hypertension. The symptoms include:
  - Gradual onset with slight fever, fatigue, upper quadrant abdominal pain
  - Jaundice is mild
  - Emaciation
  - Chronic flatulent dyspepsia, anorexia, nausea and vomiting (especially in the morning) and constipation or diarrhoea. These symptoms occur due to back pressure on the GIT.

- Abdominal distension showing distended veins (spider angioma or telangiectasis). The distension may be due to ascites or hepatomegaly and splenomegaly
- Ascites and pedal oedema due to abdominal congestion, low plasma albumin and salt and water retention.
- Oesophageal varices and haemorrhoids due to congestion of veins in the GIT
- As fatty degeneration of the liver and fibrosis occur, there is hepatic insufficiency which results in bleeding tendencies due to low production of prothrombin and fibrinogen in the liver. Low production of plasma proteins aggravates oedema (albumin) and increases susceptibility to infections (globulin).
- Pruritus (itching of the skin) due to dry skin and jaundice

With obstruction to bile flow, there is accumulation of bile salts and with failure of the liver to convert ammonia into urea the ammonia accumulates and is absorbed from the gut. These 2 toxic substances irritate the brain causing hepatic encephalopathy which manifests as

- Mental changes like lethargy, drowsiness, mental confusion, delirium and convulsions and later on coma which may lead to death
- Severe nausea and vomiting
- Altered sleep patterns (insomnia at night) and as liver failure progresses the patient may go into coma and be difficult to awaken
- Asterixis (flapping tremor of the hand) with difficulty carrying out even simple tasks
- The patient has a sweet, slightly faecal odour to his breath (fœtor hepaticus)

### 3. Physical Examination

- *Inspection* of the abdomen reveals abdominal distension with distended veins (spider telangiectasis or angioma) and ascites. Inspection of the legs shows pedal oedema and there may be spider telangiectasis on the cheeks. The skin is jaundiced and sometimes pale indicating anaemia.
- *Palpation* reveals abdominal tenderness, large, firm liver with a sharp edge or nodular outline and enlarged spleen.

### 4. Diagnostic tests:

- a) Blood studies show
  - High liver enzymes e.g. Serum aminotransferases, (both alanine and aspartate) and serum alkaline phosphatase.
  - High total serum bilirubin

- High gamma globulin (especially in post necrotic and biliary cirrhosis)
  - Low total serum albumin
  - High bile salts especially in biliary cirrhosis
  - Low serum vitamins especially A, C and K
  - Low haematocrit, haemoglobin and prothrombin (with prolonged prothrombin time).
- b) Needle biopsy of liver tissue detects destruction and fibrosis
- c) Abdominal x-rays reveal abnormality in liver size and also identify masses
- d) CT scan after injection of radioactive dye reveals decreased uptake of dye in the liver and helps to visualize the liver and determine its size.

### **Nursing Diagnosis**

1. Ineffective breathing pattern R/T abdominal distension secondary to accumulation of fluid in the abdomen with incursion on the diaphragm.
2. Imbalanced nutrition R/T anorexia, dyspepsia and non-synthesis of plasma proteins
3. High risk for gastrointestinal bleeding R/T altered clotting mechanism secondary to poor synthesis of clotting factors in the liver.
4. High risk for injury R/T altered level of consciousness secondary to deterioration of liver function and irritation of brain cells by excess serum bile salts and ammonia.
5. Fluid volume excess (pedal oedema and ascites) R/T accumulation of fluid in the tissues secondary to impaired flow of blood and lymph.
6. Impaired skin integrity R/T oedema in the tissues.
7. Activity intolerance R/T fatigue and general debility

### **Planning and Implementation**

Objectives of management include:

- To rest the liver and prevent further liver damage
- To prevent and /or correct malnutrition
- To control / prevent bleeding in the GIT
- To reduce pedal and abdominal oedema

### **Nursing Management**

*If there is no liver failure the following are put in place:*

1. Encourage patient to rest to permit the liver to re-establish its functional ability.
2. Monitor and carefully observe:
  - Patient' vital signs 4-hourly
  - Fluid intake and output in order to identify signs of internal bleeding. Bleeding may be due to ruptured oesophageal varices or bleeding gastric ulcer
  - Patient's weight – weigh patient on alternate days
  - Degree of jaundice
  - Check mental state for symptoms of hepatic encephalopathy
  - Check skin for ecchymosis and petechiae and gums for bleeding
3. Nursing care to enhance comfort include
  - Providing the patient with emesis bowl when he is vomiting
  - Giving the patient water to rinse the mouth after vomiting and giving iced cube to suck or iced water to sip to aid constriction of bleeding vessels in the stomach.
  - Keeping the patient warm
  - Giving daily bath using mild/bland soap. Bathing should be gentle (because of oedema which impairs tissue integrity) after which lanolin is gently massaged into the skin to soothe the skin and prevent itching.
  - Gentle mouth care
  - Adequate positioning to facilitate breathing and ensure comfort. There should be frequent change of position and treatment of pressure areas to prevent break in the oedematous skin.
4. Diet should be nourishing and high in protein, calorie (2,500-3,000 kcal in the form of carbohydrates) and vitamins, especially A, B, C and K. It should also be low in fat (because of nausea and jaundice) and in salt and fluids (because of oedema). Assist with meals and offer small, frequent meals. Advise patient to avoid alcohol.
5. Give emotional support as appropriate.
6. If there is no bleeding, IV infusion of dextrose 5% or 10% to which Vitamin B complex has been added should be given to protect the liver and control the jaundice.
7. If patient is bleeding and there is haematemesis from ruptured oesophageal varices or bleeding gastric ulcer,
  - Advise patient to stay quiet and avoid stress
  - Elevate the foot of the bed to prevent/treat for shock

- Report to doctor who will control the bleeding and replace blood loss with transfusion of blood.
8. Patient education: patient should be advised to:
- Have adequate rest but alternate rest with moderate exercise
  - Take appropriate diet
  - Avoid alcohol, nicotine, caffeine, spicy foods
  - Avoid straining at stool (therefore prevent constipation), vigorously blowing the nose or sneezing too hard etc. as these increase the risk of bleeding.
  - Take medications as prescribed and avoid unprescribed drugs as some may be hepatotoxic
  - Have regular check-up and report to hospital if ill

***If there is liver failure or the presence of symptoms indicating its imminence,***

- Eliminate protein from diet
- Reduce bacterial production of ammonia by giving Neomycin
- Maintain safety by ensuring that the patient is nursed in cot-sided bed
- Ensure adequate hydration through intravenous infusion
- Monitor vital signs more frequently

### **Medical Management**

1. If the patient is bleeding,
  - Vasoconstrictor e.g. Pitressin is given intravenously,
  - Blood transfusion is given to replace loss. If blood is not available, plasma substitutes e.g. Dextran or Haemacele are infused.
  - Sengstaken-Blakemore tube is passed to compress bleeding vessels on the lower oesophagus. This involves gastric intubation and oesophageal balloon tamponade.
  - If the above measures do not control the bleeding, the doctor may decide on ligation or sclerosis of the bleeding vessels in the theatre.
2. If the bleeding is due to gastric ulcer, antacids and histamine antagonists are given.
3. Vitamin B complex supplements e.g. parentrovite forte is usually added to the intravenous infusion to protect the liver.
4. Neomycin or Lactulose is given to reduce ammonia production

### **Evaluation**

Cirrhosis of the liver is a chronic disease which usually may progress to long term complications despite treatment. These complications include hepatic failure, hepatic encephalopathy, hepatic cancer (hepatoma), thrombocytopenia (decreased number of platelets), susceptibility to haemorrhages e.g. bleeding oesophageal varices, bleeding haemorrhoids etc., microcytic, hypochromic anaemia and portal hypertension.

### SELF ASSESSMENT EXERCISE 1

1. Review the full macroscopic and microscopic structure and functions of the liver, biliary tract and the pancreas.
2. Review the hepatic portal system and describe the portal circulation.
3. Describe:
  - The formation and movement of bile
  - The actions of pancreatic juice.
  - The metabolism of protein by the liver
4. List at least 5 differences between hepatitis and cirrhosis of the liver.
5. Read up the nurse's responsibilities for a patient who is having a Sengstaken-Blakemore tube.

### 3. CHOLECYSTITIS AND CHOLELITHIASIS

#### Definitions

**Cholecystitis** is the acute or chronic inflammation of the gall bladder.

**Cholelithiasis** is the formation of gallstones. The gallstones may be small or large, single or multiple and may lodge either in the cystic duct causing cholecystitis or in the common bile duct (**choledocholithiasis**) causing biliary obstruction and **cholangitis** (inflammation of the bile duct) or may pass out of the gallbladder and lodge in the small intestine. The calculi (stones) are composed of cholesterol, calcium, bilirubin and inorganic salts.

Two types of gallstones may be formed:

- Those that are composed predominantly of unconjugated pigment which precipitate in the gall bladder. This type accounts for  $\frac{1}{3}$  of gallstones and are more common in patients with cirrhosis of the liver and biliary tract infections.
- Those that are composed predominantly of cholesterol are more common accounting for  $\frac{2}{3}$  of all cases.

Cholelithiasis and the acute form of cholecystitis are most common in middle aged, obese, multiparous females in their forties and fifties, while the chronic form is common among the elderly.

### **Causes**

Causes of cholecystitis include:

1. Formation of stones in the gallbladder. This accounts for 90% of all cases of cholecystitis and may be due to:
  - Abnormal metabolism of cholesterol and bile salts (metabolic causes)
  - Stasis in the flow of bile (biliary stasis) due to inflammation in the gallbladder whereby bile salts combine with cholesterol and calcium salts to form stones
  - Increased intake of cholesterol in the diet
  - Immobility and prolonged low fluid intake causing stasis in bile flow with absorption of water from bile causing concentration of the bile
  - Hypothyroidism
2. Diseases like pancreatitis, diabetes mellitus, cirrhosis of the liver etc.
3. Trauma, adhesions and reduced blood supply to the gallbladder
4. Long term use of oral contraceptives, clofibrate and oestrogen therapy.
5. Obesity and prolonged immobility
6. Obstruction of the cystic duct by torsion or gallstones (calculus cystitis)
7. Age (there is high hepatic secretion of cholesterol and decreased bile acid synthesis in old age)
8. Sometimes bacterial infection may be responsible for the gall bladder inflammation
9. Chronic cholecystitis is caused by prolonged irritation by gallstones

### **Pathophysiology**

Irritation of the gall bladder causes inflammation which leads to oedema of the wall of the gallbladder, impaired circulation, distension and ischaemia which if unrelieved results in necrosis and gangrene. Perforation may occur resulting in peritonitis, pancreatitis and fistula formation. In the chronic type, prolonged mechanical irritation by gallstones causes pressure on the mucosa of the gallbladder resulting in stasis to the flow of bile. With inefficient emptying of the organ, bacteria and irritants are trapped thus causing chronic inflammatory process.

In cholelithiasis, the gallstones may lodge in the hepatic duct, cystic duct or in the common bile duct or ampulla of Vater causing obstruction and inflammation. It may pass out of the gallbladder into the small intestine and if the stone is small enough it may easily pass out of the body through faeces, but if too large it may obstruct the small bowel.

## **NURSING PROCESS RELATED TO THE PATIENT WITH CHOLECYSTITIS AND CHOLELITHIASIS**

### **Assessment**

1. **Health History:** There is history of intolerance to fatty foods and a sudden onset of severe aching pain in the mid-epigastrium with mild GIT symptoms preceding the acute attacks. In gallstones, there is history of classic biliary attack with severe colicky pain especially after a fatty meal.
2. **Clinical Manifestations:** *Acute Cholecystitis:* symptoms include acute attack of severe colicky pain (biliary colic) in the right upper quadrant or mid-epigastric area of the abdomen. The pain radiates to the back and right shoulder and usually occurs in the night waking up the patient, especially after the intake of a fat-rich meal or a large meal or a period of fasting. Other symptoms include indigestion, nausea and vomiting, belching and flatulence especially after fatty meals; low grade fever and chills, diaphoresis (excessive sweating), tenderness, distension and rigidity of the upper right abdomen.

*Chronic cholecystitis:* symptoms are chronic dyspepsia, indigestion, flatulence and epigastric pain.

*Cholelithiasis:* if there is no obstruction, the symptoms are the same as for chronic cholecystitis. If obstruction occurs there is severe agonizing epigastric and upper right abdominal pain which radiates to the shoulder and back; vomiting, sweating, severe indigestion and jaundice. If the stone is small it may pass into the duodenum during biliary colic and be passed in faeces.

### **3. Physical Examination**

- *Inspection* reveals a patient in pain with pallor, diaphoresis and exhaustion; jaundice and clay-coloured stools and dark-coloured urine.
- *Palpation* reveals tenderness over the gallbladder which increases on inspiration
- *Auscultation* reveals hypoactive bowel sounds

#### 4. Diagnostic Tests

- Blood studies reveal leucocytosis (elevated white cell count, up to 12,000 – 15,000 / mm<sup>2</sup>); elevated serum alkaline phosphatase, total albumin, Alanine aminotransferase (formerly SGPT) and Aspartate aminotransferase (formerly SGOT).
- Gallbladder series reveal a non-functioning gallbladder. The 2 tests involved in these tests include cholecystography and IV cholangiography in which radio-opaque material is either injected or given orally and x-rays taken. For cholecystogram, 6 tablets of radio-opaque material (bilopaque or telepaque) are given with water on the evening before the examination and x-rays of the gallbladder done the following day. For IV cholangiography, the radio-opaque material is given intravenously just before x-rays. A fatty meal or stimulant e.g. black coffee or tea is given the day before, to pump bile into the bile duct and that evening a low-fat meal is given after which nothing is allowed by mouth until after the test. After the test a saline enema may be given if a fatty meal was given to help pump bile into the bile duct.
- Ultrasound may reveal gallstones, thickening of the walls of the gallbladder by more than 3 mm, distension of the gallbladder lumen by more than 5 cm.
- Plain abdominal x-rays reveal enlarged gallbladder with stones or limy substance.
- For gallstones the above diagnostic tests are also relevant plus endoscopic retrograde cholangio-pancreatography.

#### Nursing Diagnosis

1. Fluid volume deficit (actual) R/T vomiting; or risk for fluid volume deficit R/T nausea
2. Acute abdominal pain R/T inflammation, congestion and distension of the gallbladder. It may also be related to spasms of the gallbladder.
3. Risk for infection R/T biliary obstruction
4. Imbalanced nutrition R/T inadequate bile secretion and indigestion.

#### Planning and Implementation

Objectives of intervention include:

- To relieve pain
- To improve dietary status

#### Nursing Management

The management of acute cholecystitis and conservative treatment of gallstones are similar and include:

1. Encourage rest
2. Relieve pain with narcotic, antispasmodic or anticholinergic drugs. Hot fomentations may be applied to the abdomen to relieve pain.
3. Nothing should be permitted by mouth because of the vomiting while nasogastric intubation is used to aspirate the stomach to relieve the vomiting. To maintain hydration, intravenous fluids are given. After the acute stage a bland diet should be given (low fat, high protein, carbohydrate and vitamins A, D, E, K) and copious fluids. Meals should be in small amounts at frequent intervals.
4. Monitor vital signs, intake and output, signs and symptoms of biliary obstruction and assess for pain.
5. Comfort measures e.g. adequate skin care, frequent mouth care while nasogastric tube is in place, frequent change in position and tepid sponging when feverish.
6. Promote emotional support by encouraging patient to verbalize anxieties and fears.
7. The bowel should be kept free with mild laxatives.
8. Patient education on:
  - Adequate diet -low fat
  - Compliance with therapy and diet modification

### **Medical Management**

Medical management includes:

1. Narcotic analgesics to relieve pain
2. Antibiotics e.g. ampicillin, ampicloxacin etc.
3. Anticholinergics and antispasmodics to reduce biliary spasms and contractions that causes pain.
4. Antiemetics to relieve nausea and vomiting
5. Vitamin supplements (A, D, E, and K).
6. Bile salts to facilitate digestion and vitamin absorption.
7. Non-surgical removal of gallstones by either dissolving the stone with solvents like methyl tertiary butyl ether (MTBE) infused into the gallbladder or through lithotripsy (a procedure to crush gallstones through ultrasonic waves or laser pulse). This enables stones to be passed out without surgical intervention but is effective for stones that contain predominantly cholesterol.
8. Surgical intervention is the most common form of treatment in highly infected cholecystitis and in gallstones include:

- Cholecystectomy (removal of the gallbladder); with anastomosis of the common bile duct to the duodenum or jejunum.
- Cholecystostomy (opening into the gallbladder for drainage)
- Choledochostomy (incision into common bile duct)
- Choledocholithotomy (incision into the common bile duct to remove a stone)

### **Pre-Operative Care**

Explain the surgery to the patient and follow other routines as for general abdominal surgery.

### **Post-Operative Care**

1. Place patient in low-Fowler's position
2. Attach nasogastric tube to suction and monitor drainage
3. Check wound dressing and reinforce or change as necessary. Keep skin dry to prevent excoriation. Ensure that the biliary drainage is not left on the skin as this can cause excoriation.
4. A T-tube is usually inserted into the common bile duct through an incision to maintain patency of the duct and ensure drainage of bile outwards. Therefore assess the patency of T-tube and monitor the amount of drainage. If not flowing sufficiently report to the doctor because it shows that the drainage is blocked and the bile is flowing backwards. Avoid kinking or pulling of the tube.
5. Before the T-tube is removed, the tube is clamped for variable intervals and the patient monitored for distress. The tube is removed when there is no distress and the patient is monitored for any adverse reaction. The patient may have fever and chills after removal of the tube; this is a local reaction to bile and usually subsides within 24 hours.
6. When bowel sounds are present and nasogastric tube is removed, start feeding with graded oral fluids and progress to normal diet.
7. During the period of external bile drainage, patient should be given oral bile preparations (tablets or solution) to improve digestion. This is given through nasogastric tube, when patient is taking nothing by mouth and later mixed with tomato juice or grape juice to mask colour and bitter taste when patient starts taking food orally.
8. Patient teaching should include:
  - the need to keep the skin around the wound dry
  - taking a low-fat diet
  - to avoid lifting of heavy objects

## Evaluation

Effective management of cholecystitis resolves the infection otherwise pus may form in the gallbladder or it may become gangrenous or perforate resulting in peritonitis, pancreatitis and fistula formation. After surgery post-cholecystectomy syndrome may occur and is marked by fever, jaundice and pain.

## 4. PANCREATITIS

**Definition:** This is inflammation of the pancreas brought about by digestion of the organ by the very enzymes it produces especially trypsin. This happens if the pancreatic juice is activated while the juice is still in the pancreas and so starts digesting the parenchyma cells of the organ.

**Types of pancreatitis:** Pancreatitis may be acute or chronic; mild, moderate or severe; interstitial, haemorrhagic or necrotic. The interstitial type is characterized by oedema of the gland with escape of enzymes into the parenchyma and peritoneal space. Pancreatic lipase then causes fat necrosis of the omentum resulting in excessive peritoneal fluid secretion. In the haemorrhagic type, there is widespread digestion of the glandular tissue and widespread necrosis with haemorrhage into the tissues and peritoneum.

### Causes

The aetiology of *acute pancreatitis* is not clear but predisposing factors include:

1. Alcoholism
2. Biliary obstruction from gallstones, cancer of the ampulla of Vater and of head of pancreas, fibrosis of the pancreatic duct, spasms of the sphincter of Oddi.
3. Trauma to the pancreas thus releasing the enzymes into the pancreatic parenchyma.
4. Pancreatic cysts and tumours
5. Toxic effect of certain drugs (e.g. sulphonamides, thiazides, corticosteroids, oral contraceptives etc).
6. Effect of toxins of certain bacteria
7. Viral infections e.g. mumps
8. Duodenitis resulting in spasms and oedema of the ampulla of Vater
9. Biliary tract infection

**Chronic pancreatitis** is caused by chronic biliary infections, chronic alcoholism with malnutrition, hyperparathyroidism, extensive pancreatic trauma and repeated attacks of acute pancreatitis.

**Pathophysiology:** Any factor that impedes the flow of pancreatic juice or bile causes inflammation in the pancreas. When the flow of pancreatic juice into the duodenum is impaired, there is a reflux into the pancreatic tissue causing auto-digestion by trypsin. On the other hand obstruction to the flow of bile diverts it into the pancreas and this activates powerful proteolytic enzymes which cause auto-digestion of the pancreatic tissue. With auto-digestion, there is *oedema* and rupture of cells in the surrounding tissues (interstitial pancreatitis) and further release of enzymes into parenchyma and peritoneum resulting in abdominal pain, shock, nausea and vomiting. If the auto-digestion continues, necrosis of cells occurs with erosion of blood vessels and *bleeding* into the organ and the peritoneum (haemorrhagic pancreatitis). Fat necrosis of the omentum occurs later with marked pain and tenderness, formation of cysts and pockets of abscess in the gland. At this stage the disease has 60% mortality rate. During the chronic stage, there is fibrosis of the main pancreatic duct with distortion of its patency and calcification of the pancreatic tissue resulting in impaired fat and protein digestion and absorption.

## **NURSING PROCESS RELATED TO THE PATIENT WITH PANCREATITIS**

### **Assessment**

- 1. Health History:** There is history of causative factors e.g. alcoholism, biliary disease, use of thiazides and sulphonamides, trauma to the left side of the abdomen. There is history of intense epigastric pain radiating to the back and aggravated by consumption of fatty foods or alcohol; progressive weight loss, nausea and vomiting.
- 2. Clinical Manifestations:** Acute pancreatitis has a sudden onset of constant, severe, excruciating and burning epigastric pain (which radiates to the back), initial fever which later turns to hypothermia when shock sets in. These symptoms are preceded by vague GIT disturbances e.g. indigestion, anorexia, nausea, constipation etc. Other symptoms include jaundice and bulky foul-smelling stools (if the head of pancreas is obstructed), severe weight loss, diminished peristalsis, impaired glucose tolerance (hyperglycaemia and glycosuria) due to involvement of the islet cells. If respiratory complications occur, dyspnoea or orthopnoea also manifest. In chronic pancreatitis, the pain is recurrent and defies even strong

analgesics and the patient complains of flatulence, severe weight loss over time and steatorrhoea.

***The patient with acute pancreatitis is usually critically ill.***

### **3. Physical Examination**

- *Inspection:* abdominal inspection reveals distension, Cullen's sign (dark bluish peri-umbilical discoloration), Turner's sign (dark blue discoloration on the flank) and generalised jaundice. Stool inspection may reveal steatorrhoea (fat in stool).
- *Palpation:* palpation reveals abdominal tenderness, rigidity and guarding
- *On percussion* there is a dull sound signifying ascites and fluid collection in the peritoneal cavity
- *Abdominal auscultation* reveals absent or decreased bowel sounds signifying paralytic ileus.

### **4. Diagnostic Tests**

a) Critical tests for acute pancreatitis include:

- Serum amylase level is increased above 500 units/dl or 130 units/litre.
- Serum lipase level is increased above 80 units/litre
- Urinary amylase is increased above 80 units or 300 somogyi units/hour.

The above 3 tests confirm acute pancreatitis.

b) Supportive laboratory tests include:

- Abdominal x-rays may reveal pancreatic congestion and cysts
- Computed tomography scan shows enlarged pancreas with cysts and pseudocysts
- Ultrasound shows areas of pancreatic disease.

In chronic pancreatitis serum alkaline phosphatase, serum amylase and albumin are elevated while serum calcium and potassium are decreased. The stool also contains a lot of lipids (fats) and trypsin.

### **Nursing Diagnosis**

1. Acute abdominal pain R/T inflammation, oedema, and distension of the pancreas.

2. Imbalanced (altered) nutrition: less than body requirements R/T malabsorption of nutrients secondary to deficiency of pancreatic enzymes. It may also be related to anorexia.
3. Fluid volume deficit (actual) R/T vomiting. If the patient has nausea there is risk for fluid volume deficit.
4. Ineffective breathing pattern R/T severe upper abdominal pain with elevated diaphragm.

If surgery (*pancreatectomy*) is the treatment of choice, the acute pain is related to abdominal incision and the ineffective breathing pattern is related to guarded respirations caused by abdominal incision.

### Planning and Implementation

Objectives of care include:

- To relieve pain
- To maintain fluid volume and electrolyte balance
- To prevent and treat infection

To achieve these, the following nursing and medical managements are done.

### Nursing Management

1. Place patient predominantly in semi-Fowler's position to decrease pressure on the diaphragm.
2. Encourage bed rest in a quiet, restful environment
3. Ensure pain relief through:
  - Adequate positioning
  - Avoidance of fatty foods and stimulants like caffeine, alcohol and spices.
  - Use of strong analgesics like Demerol or Pethedine HCL 100mg as necessary. Avoid morphine and codeine as these cause spasms of the sphincter of Oddi thus causing pain
  - Use of hot compress and fomentation on the abdomen
  - Gentle massage of the flank
4. Assess and monitor
  - Vital signs, fluid intake and output, nasogastric drainage (for colour, consistency and amount)
  - Level of pain and response to analgesics

- Stool for consistency, odour etc.
  - Abdominal distension (ascites), signs of tetany (low calcium level)
  - Blood sugar
  - The skin for jaundice
5. Gastric care
- Withhold fluids and foods (nil per oral) for 24-48 hours especially during crisis
  - Nasogastric suction to keep the stomach empty and relieve gastric/abdominal distension and vomiting
6. Fluids and nutrition:
- Rehydrate with intravenous fluids. Whole blood or plasma may be given in haemorrhagic pancreatitis
  - Nil per oral until the crisis resolves. This is to rest the pancreas.
  - Thereafter give bland, high carbohydrate, low fat, low protein, fluid diet initially. This should be given in small amounts at frequent intervals. Stimulants (alcohol, caffeine, spicy foods etc.) and large meals, should be avoided because these stimulate the sphincter of Oddi and increase nausea
  - If hyperglycaemia is present, diet modification becomes necessary
  - Pancreatin (pancreas extract) may be given with meals to aid digestion because pancreatic enzymes are low in pancreatitis.
7. General nursing care involves:
- Adequate skin and mouth care - anticholinergics cause dryness of the mouth
  - Adequate nasal care when nasogastric tube is in situ
  - Assist in position change
  - Advise to cough and breathe deeply to improve respiration
8. Psychological care: provide emotional support, encourage patient to verbalize his anxieties and fears, allay these through reassurance and empathetic care.
9. Advise to avoid heavy meals, stress, infections, fatigue, alcohol and smoking.
10. Pre-operative care is the same as for any major abdominal surgery plus special care like giving of Vitamin K parenterally, giving antibiotic bowel preparation from 6 hours before surgery till 72 hours after surgery and passing nasogastric tube immediately before surgery.

## 11. Post-operatively

- Place patient in appropriate position (Fowler's or semi-Fowlers) after he/she has regained consciousness
- Maintain fluid and electrolyte balance
- Monitor vital signs, drainage from the pancreatic tube (in the pancreatic bed), T-tube in the common bile duct and the nasogastric tube; blood glucose level and bowel sounds (from the second day). Drainage from the T-tube should be about 600 to 800 ml daily and decreasing in quantity as bile goes into the intestines.
- The drainage tubes are removed when they are no longer productive.
- Care for the skin around the drainage tubes to prevent excoriation and skin breakdown from pancreatic juice or bile.
- Inspect the wound dressing and reinforce if necessary and remove stitches as ordered by the doctor.
- If there are no complications GI functions should return in 48 to 72 hours, thereafter the nasogastric tube is removed and the patient started on graded oral fluids when bowel sounds are heard.
- Patient is advised on compliance with drug regimen and diet modification; avoidance of alcohol and other stimulants, care of the wound site and monitoring of blood sugar or urine sugar.

## Medical Management

Medical management involves the use of:

1. Analgesics and antispasmodics e.g. Pethedine HCL, Meperidine (Demerol)
2. Antibiotics e.g. Gentamicin
3. Anticholinergics e.g. propantheline 15mg t.d.s to reduce vagus nerve stimulation and inhibit pancreatic enzymes
4. Antacids to neutralize gastric secretion
5. Histamine antagonists (Cimetidine 200mg or Ranitidine 300mg bid or t.d.s. 30 minutes before meals). These reduce hydrochloric acid production.
6. Insulin may be given to correct hyperglycaemia if present.
7. Calcium supplements as lactate or gluconate 10mg daily
8. Pancreatin e.g. Viokase with each meal to aid digestion
9. Vitamin K may be given in haemorrhagic pancreatitis to maintain prothrombin level and prevent bleeding.
10. Vitamin supplements e.g. A, D and K, folic acid and vitamin B<sub>12</sub>.
11. In *chronic pancreatitis*, total parenteral nutrition is given to correct chronic nutritional deficiency and weight loss associated with chronic pancreatitis.
12. If conservative treatment fails, surgery is done. The surgical procedure done depends on the extent of the disease and the

condition of the patient e.g. subtotal or total pancreatectomy with pancreatico-duodenostomy (Whipple procedure) or caudal pancreatico-jejunostomy (Du Val procedure). In subtotal pancreatectomy the tail, body and neck of the pancreas are removed; in total the whole organ and the spleen are removed and the hepatic duct is anastomosed with the duodenum or jejunum.

### **Evaluation**

Positive outcomes are achieved with prompt and effective management. Certain complications may however occur in acute pancreatitis including chronic pancreatitis, diabetes mellitus, respiratory distress syndrome, pancreatic abscess, chronic nutritional deficiency etc. post-operative complications after pancreatectomy include haemorrhage, fistula, obstruction of the common bile duct and insulin dependence.

## **4.0 CONCLUSION**

Having completed the course material on this unit, you are expected to have understood the peculiarities of medical-surgical conditions of the liver, biliary tract and pancreas and how they affect the intake and digestion of food.

## **5.0 SUMMARY**

This unit has discussed the common diseases affecting the accessory organs of digestion and how they affect the nutritional status of the patient.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. Describe the actions of pancreatic juice on the various food nutrients
2. Discuss the types of liver cirrhosis and the major differences between them
3. Mr. Williams, aged 54 years has just been admitted into the male medical ward with a history of chronic alcoholism and has not been eating well. He is jaundiced and complains of abdominal pain. After examination and liver function tests, the physician makes a diagnosis of liver cirrhosis.
  - a) Using the nursing process approach, discuss the nursing and medical management of Mr. Williams
  - b) Describe the typical diet you would give to the patient with cirrhosis of the liver

## 7.0 REFERENCES/FURTHER READINGS

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**APPENDIX 1****SAMPLE NURSING CARE PLAN FOR CLIENT WITH RESPIRATORY PROBLEM**

<b>NURSING DIAGNOSIS</b>	<b>PATIENT OBJECTIVES/ OUTCOMES</b>	<b>NURSING ORDERS</b>	<b>SCIENTIFIC PRINCIPLES</b>	<b>NURSING EVALUATION</b>	<b>SIGN. OF NURSE</b>
1. Ineffective breathing pattern related to increased airway resistance secondary to bronchospasm.	Patient maintains optimal breathing pattern as evidenced by regular pattern of breathing at the rate of 18 to 22 per minute within 2 hours.	1. Place patient in upright position with head of bed elevated. 2. Loosen tight clothing around neck, chest and waist. 3. Encourage slow, deep breathing. 4. Give bronchodilators as prescribed.	1. This position allows for adequate lung and chest expansion and optimizes breathing. 2. This action frees the chest to expand and eases breathing. 3. Slow, deep breathing increases pressure within the bronchioles to keep them open. 4. Bronchodilators dilate the bronchial tube thus ensuring effective breathing.	Goal met. Within 2 hours patient's breathing was regular at the rate of 22 per minute.	
2. Ineffective airway clearance related to increased sputum production secondary to respiratory infection.	Patient's airway is maintained free of secretions and breath sounds are normal and clear within 4 days.	1. Instruct patient to cough and breathe deeply. 2. Carry out chest percussion and postural drainage. 3. Encourage fluid intake. 4. Maintain humidified atmosphere.	1. Coughing and deep breathing brings up secretions to be expectorated. 2. Chest percussion loosens secretion while postural drainage drains it from the lungs and bronchial tree. 3. High fluid intake replaces loss through sputum. 4. Humidification decreases viscosity of secretions for easy expectoration.	Goal met. Patient's breath sounds were normal and clear and sputum was brought up easily from the airway.	
3. Sleep pattern	Within 24 hours	1. Give antitussives as	1. Antitussives depress the	Goal not met.	

disturbance related to presence of dry, irritating cough.	patient falls asleep without difficulty and sleeps for at least 2 hours each time during the day and at least 6 hours at night.	prescribed. 2. Encourage rest and sleep by keeping environment quiet and properly humidified and not disturbing the patient. Pace care activities around waking periods.	cough reflex by inhibiting the cough centre thereby relieving dry, unproductive cough. 2. A quiet, humidified environment enhances comfort and ensures sleep. Pacing care activities around waking periods allows for undisturbed sleep.	Patient slept for only 45 minutes during the day and 4 hours at night. Revise the plan.	
4. Anxiety related to breathing difficulties.	Patient verbalizes reduction of anxiety within 2 hours.	1. Keep the patient as calm as possible. 2. Encourage patient to verbalize fears and anxieties and reassure.	1. Keeping calm reduces breathing difficulties and ultimately reduces anxiety related to breathing difficulties. 2. Verbalization of fears ensures proper reassurance	Goal met. Patient verbalized reduction of anxiety within 2 hours.	